ALARKO

HARMONY – D

USERS, INSTALLATION AND SERVICING INSTRUCTIONS

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Thank you for choosing ALARKO brand.

This booklet covers room sealed model HARMONY-D natural gas/LPG combination boilers in ALARKO-CARRIER boiler range.

In this booklet you will find the instructions for use in USE section and instructions for installation and maintenance in INSTALLATION AND MAINTENANCE section.

For long-term and safe use of the boiler, the user must read the USE section of this booklet carefully before using the boiler. Other sections of this booklet are not for the end-user.

People or organizations authorized to install, commission and service this boiler must follow the instructions in INSTALLATION AND MAINTENANCE section of this booklet to ensure the correct installation and operation of the appliance.

For further information, please consult to the product introduction brochure or authorized dealers and services.

Keep this booklet on hand to consult to whenever you may need.

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USER INSTRUCTIONS

1. Introduction

In this booklet you will find users and servicing instructions of your new Harmony – D digital screen combination boiler and some useful information and technical data about it. Harmony combination boilers are the results of development, production and marketing experience, which have resulted in the current highly efficient and user-friendly models. The compact size and pleasing appearance enable them to be fitted in a wide range of locations. Despite its compactness, all inner pipe-work and components are designed to allow easy access for the service engineer.

The appliance is suitable for sealed systems only.

Our authorized seller and services will give you the enough information about use and maintenance after setting up the boiler. You can ask any further question to them. Our experts will be glad to answer your questions.

In order to use the boiler in safe, high efficiency and economic way for a long life period; please read these instructions carefully and obey the safety rules and warnings.

In addition to the users instructions in this booklet, there are also technical data and introductory information about the boiler.

Read the instructions and other labels carefully, before starting the boiler.

Take into consideration all the warnings.

Do not handle the parts of the boiler in a different way than specified in the instructions.

DECLERATION OF CONFORMITY AND CERTIFICATION

Alarko Carrier manufacture boilers referred to in this booklet are produced in conformity with below: EC Directives and can hold the CE mark.

2009/142/EC Gas Appliances Directive

92/42/EEC Efficiency Directive

2004/108/EC Electromagnetic Compatibility Directive

2006/95/EC Low Voltage Directive

The appliances are certified to comply with the requirements of EN 297, EN 483 and EN 625 using the gas categories listed below:

2H and **2E**; G20 gas with a governed gas supply at 20 mbar inlet pressure

3 B/P; any mixture of G30 and G31 gases with a governed gas supply at 29-mbar-inlet pressure **3**+; G30 / G31gases with non-governed gas supplies at 29 / 37 mbar inlet pressures, respectively.

TERMS AND CONDITIONS OF GUARANTEE AND SERVICE

Your boiler is guaranteed for material defects and mechanical failure as written on the Guarantee Form.

The guarantee is only valid if the appliance is installed in accordance with this manual.

Guarantee is not valid under below conditions.

- Installation by unauthorized persons.
- Hazards due to service by unauthorized persons.
- Hazards due to natural disaster.
- Hazards due to bad weather conditions, especially frost, unless instructions in this booklet are obeyed.
- Damaged or changed serial number of boiler.
- Incorrect installation, use and maintenance with respect to the instructions and the regulations in force.
- Boilers produced for display and exhibition purposes.

- Absence of Guarantee Form.
- The transportation risks belong to the customer if boiler is sent to service by customer and belongs to the service if boiler is taken by service.

1.1 Gas Safety

It is the law that all gas appliances must be installed by a competent person in accordance with the current rules and regulations in force in the country of destination. With the same scope, any gas conversion process carried out on the boiler must be done by a competent person as well.

These appliances are certified to comply with the requirements of EN 483 and EN 625 using gas categories 2H, 2E, 3B/P, 3+, 3B and 3P with prescribed gas inlet pressures. No other gas use condition is allowed for the boiler.

The particular gas type that the boiler is already adjusted to is written on its data badge, unless it is converted to another gas by a competent person. Make sure that the boiler is not used with a different gas, other than which it is adjusted for or it is finally converted to.

1.2 Course of Action in case of Gas Leakage

If you smell gas or the gas alarm device signals;

- Be calm,
- Turn off the appliance,
- Open all the doors and windows to vent the room,
- Extinguish any flame,
- Close gas valves of any appliance and at the apartment inlet,
- Do not light anything and do not smoke,
- Do not switch on or off and electrical device,
- Do not attach or pull out electric plugs, do not ring the bell,
- Do not use the telephone where the gas smell exists,
- Contact your gas supplier and fire brigade and explain the situation.

Warnings!

This appliance must only be used for the intended purpose of manufacture.

Alarko Carrier Sanayi ve Ticaret A.Ş. does not take any responsibility for the damage or injury on persons, animals or objects caused by incorrect installation, service or maintenance, use except for the intended purpose or disobeying any of the warnings within this booklet.

Spaces allowed for installing a gas-fired boiler are defined by international and/or local regulations and rules of gas distribution companies. You can supply detailed information about those limitations from your installer. For your own safety, do not ask the installer to install your boiler to prohibited spaces.

Before gas installation, a suitable gas installation project has to be prepared and approved according to the requirements of local gas distribution organization. After approval of local gas distribution organization and precise application of installation, have your boiler commissioned by an Authorized Service.

Commissioning is a free service.

Do not let unauthorized people to interfere or service the boiler.

Gas conversion process, if necessary, must be made by an authorized service only.

Conversion is paid by the end-user.

Keep flammable and combustible objects, either liquid or solid, away from the boiler.

Do not place cooker near the appliance and protect the boiler from direct vapor.

Do not use any spray, chemical solvent, chlorinated cleaner, paint or adhesive near the boiler.

The boiler is to be connected to an earthed 230 V 50 Hz electric supply.

To enable the frost protection function in winter when the weather temperature might fall below 0°C, do not turn the boiler off.

Filter must be installed at the water inlet of the boiler to protect the pump and the filter must be cleaned periodically. The pump shaft should be

rotated manually before starting the boiler after a long time of inactivity. Apply the authorized service to take more information about this process.

If you charge the central heating system with hard water, this may cause blockage of the heat exchanger.

Mains supply water should not exceed 15° French hardness value. To prevent any corrosion, pH value of the water should be between 8,2 - 9,5, conductivity should be less than 30 µS/cm, and oxygen content should be less than 0,1 gr/m³.

Hot water circuit does not need a pressure relief valve. On the other hand, pressure should not exceed 6 bars. In case of doubt, a pressure regulator should be fitted. Consult your installer on this issue.

1.3 Contents of Packaging

The following items below are included in the package. Check if any item is missing.

- Hanging bracket, connection screws (4 pcs) and wall plugs (4 pcs),
- Installation, operating and maintenance Instructions
- Warranty Document,
- Standard Flue System is supplied in a separate package.

1.4 ECONOMY MEASURES

Your boiler is designed and manufactured to minimize the gas consumption.

For further saving below are recommended:

- Your boiler is adjusted to 20.726 kcal/hour of output capacity. Down rating of the heating capacity will save in houses where heating requirement is less. Consult the authorized service for adjustment.
- Use of thermostatic radiator valves or flow balance of radiators brings additional saving due to homogenous heat distribution over the house.
- Setting the temperature control knobs between the positions 4 and 6 reduces fuel consumption. On the other hand, they can be set to

other positions due to various heating and hot water requirements with no inconvenience.

- Lower setting of DHW temperature reduces fuel consumption.

2. Product Description

Harmony-D is a room sealed mono-thermal exchanger combination boiler with 24.1 kW nominal output to provide both central heating and domestic hot water.

Despite the complexity of the system, all inner pipe work and components are designed to allow easy access for the service engineer.

Ignition of the burner is provided automatically by the electronic ignition system.

The latest design of main integrated electronic board controls all safety and operational functions automatically.

A diagnostic section monitors boiler operation mode and indicates faults to the user by a Carrier© blue LCD screen located on the fascia panel.

A degree of frost protection is built into the boiler controls. When the boiler temperature falls under 6°C, the boiler starts to operate until a temperature of 15°C is reached on CH side. Additionally, there is also an antifreeze DHW protection function that operates under 5°C until 8°C is reached. These control functions prevent the boiler from freezing.

When there is no heat demand during 24 hours, pump is activated by the control board for 30 seconds to prevent the pump from getting jammed due to inactivity.

User controls are on a modern, aesthetic, and functional control panel on the boiler front. The controls allow the user to set the central heating temperature to between 30°C and 80°C and the DHW temperature to between 35°C and 60°C.

Boiler has got those features:

- Continuous full modulation for both domestic hot water and central heating,
- Three ignition attempts, (one ignition attempt for operating with LPG)

- High temperature limit thermostat safety,
- Temperature control with domestic hot water and central heating sensors, sensor fault warnings,
- Flame detection,
- Heating and domestic hot water frost protection,
- Central heating and domestic hot water pump overrun,
- Energy saving circulation pump,
- Pump jamming prevention,
- Central heating low and high pressure safety,
- Domestic hot water low pressure safety,
- Automatic by-pass,
- Hermetic pipe blocking and fan malfunction safety,
- Suitable for use with under floor heating.

The technical data is shown in Table 2.1.

2.1 Technical Data

Table 1 Technical Data

Product Model		HRD
Flue System/Type		Hermetic/$C_{12\,(x)}$
Gas Class		II2H3B / P
Reference Gas		G20
Maximum Heat Power (Net)	kW	24.1
	kcal/hour	20726
Efficiency at 100 % Load	%	93.8
Maximum heat load (Net)	kW	25.7
Minimum heat power	kW	10.11
Minimum heat load (Net)	kW	11.8
Maximum gas inlet pressure	mbar	20
Burner pressure for maximum load	mbar	11.5
Burner pressure for minimum load	mbar	1.7
Injector Diameter	mm	1.35-0.80
Ignition System		Electronic
NOx Class		3
CENTRAL HEATING SYSTEM DATA		
Pressure (max / min)	bar	3.0/0.3
Expansion Tank Volume / Pressure	lt./bar	6.0/0.2
Maximum Water Temperature	°C	85
Temperature Range	°C	30-80 or 30-50
Frost Protection Operation Temperature	°C	6
DOMESTIC HOT WATER SYSTEM DATA		
Temperature Range	°C	35-60
Pressure (max / min)	bar	6/0.2
DHW minimum flow rate	lt./min.	2.2
DHW Flow Rate at a Temp. rise of 30°C	lt./min.	12
PHYSICAL DATA		
Flue Diameter	mm.	100 (suction) / 60 (discharge)
Overall Dimensions (Width, Height, Depth)	mm.	400, 700.5, 340
Weight – Net / Gross (except flue set)	kg.	30.6 / 33.5
Heating – Supply / Return Connections	in.	3/4"
DHW – Input / Output Connections	in.	1/2"
Gas Connection (via Kit)	in.	3/4" (1/2")
Safety Valve Connection	in.	1/2"
ELECTRICAL DATA		
Electrical Connection	V/Hz	230/50
Internal Fuse Rating	A	4
Power Consumption	W	110
Electrical safety class		IP X3D

2.2 Dimensions

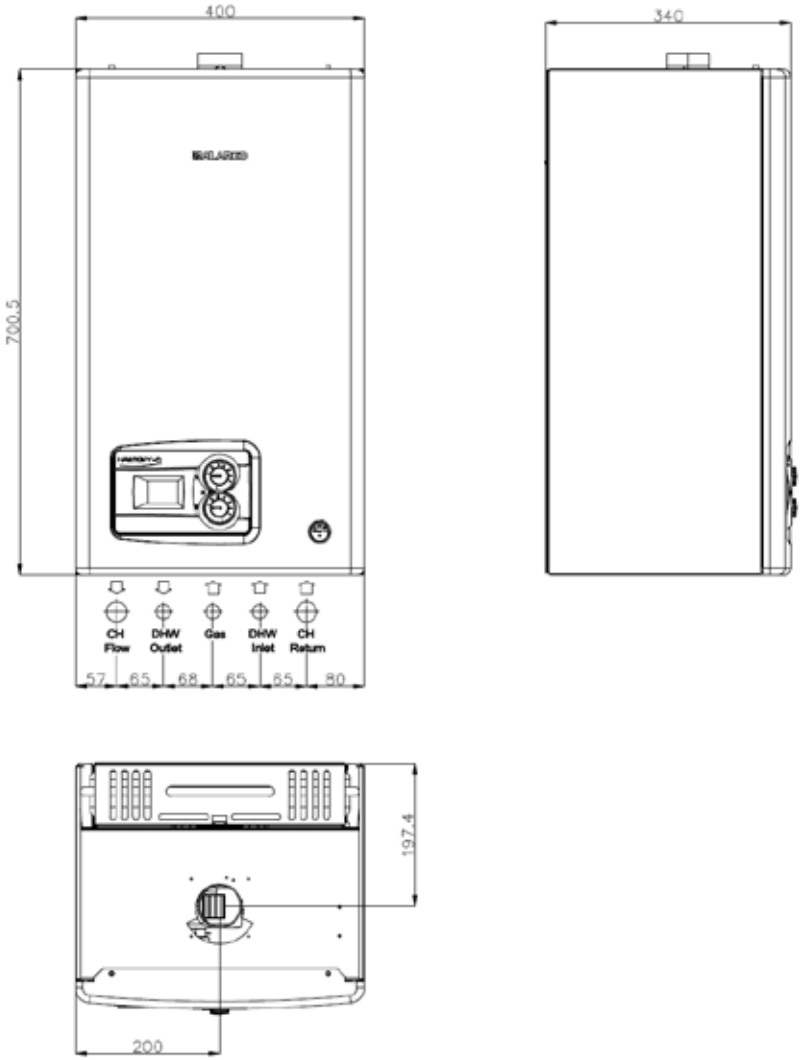


Figure 1 Boiler Dimensions

2.3 Internal Parts of the Boiler

The main parts of the boiler and water circuit are shown in Figures 2a and 2b (Front view, backside view) and Figure 3.

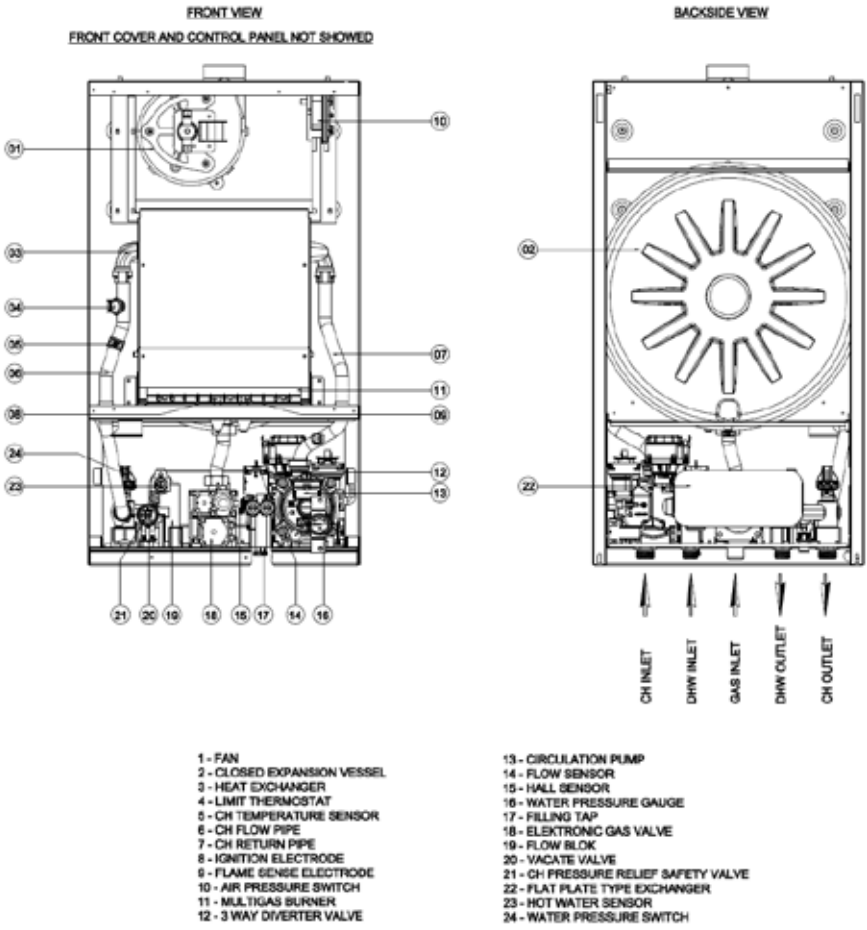

FRONT VIEW
FRONT COVER AND CONTROL PANEL NOT SHOWED
BACKSIDE VIEW
CH INLET
DHW INLET
GAS INLET
DHW OUTLET
CH OUTLET
1 - FAN
2 - CLOSED EXPANSION VESSEL
3 - HEAT EXCHANGER
4 - LIMIT THERMOSTAT
5 - CH TEMPERATURE SENSOR
6 - CH FLOW PIPE
7 - CH RETURN PIPE
8 - IGNITION ELECTRODE
9 - FLAME SENSE ELECTRODE
10 - AIR PRESSURE SWITCH
11 - MULTIGAS BURNER
12 - 3 WAY DIVERTER VALVE
13 - CIRCULATION PUMP
14 - FLOW SENSOR
15 - HALL SENSOR
16 - WATER PRESSURE GAUGE
17 - FILLING TAP
18 - ELEKTRONIC GAS VALVE
19 - FLOW BLOK
20 - VACATE VALVE
21 - CH PRESSURE RELIEF SAFETY VALVE
22 - FLAT PLATE TYPE EXCHANGER
23 - HOT WATER SENSOR
24 - WATER PRESSURE SWITCH

Figure 2a-b Main Parts of the Boiler/ Front-Backside View

2.4 Water Circuit

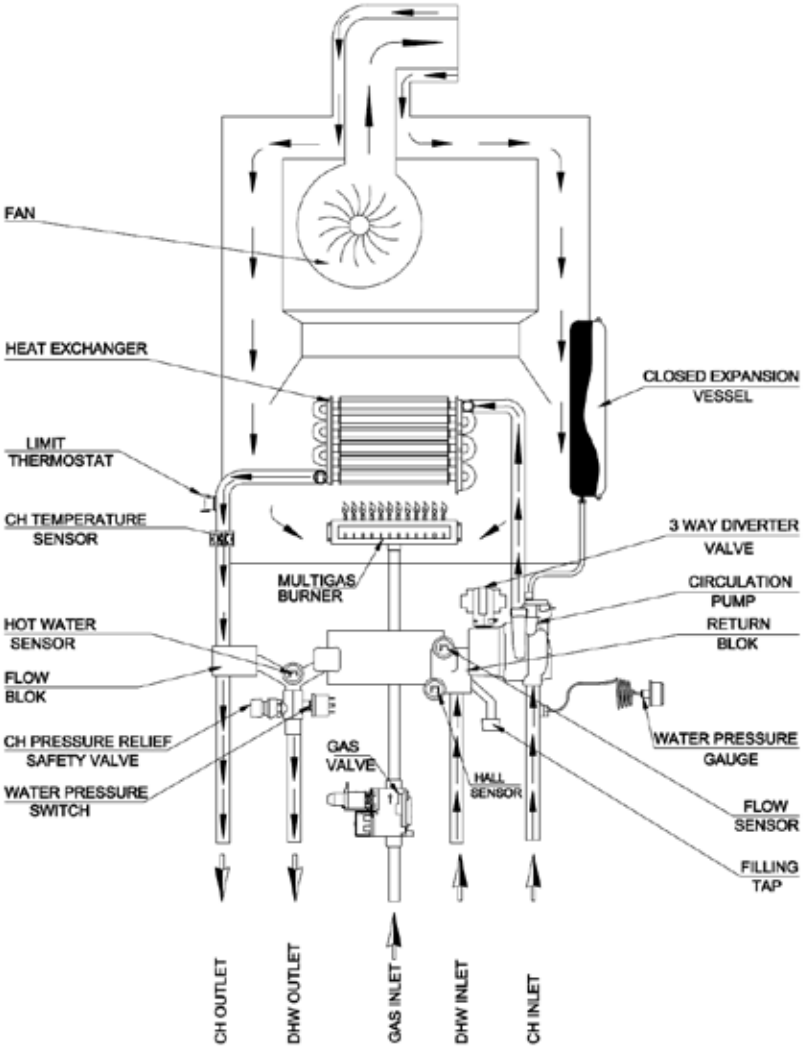


Figure 3 Water Circuit Diagram

2.5 Control Panel

The control panel is specially designed considering both easy setting of the boiler with only two knobs and a reset button on it and an aesthetic outside appearance with a surrounding blue LED lightening along the panel border. This lightening feature is arranged to be ON by default, while there is flame in the boiler. This property can also be rearranged according to customers liking so that the LED light can be ON or OFF continuously all the time.

Warning!:

Figure 4 Control Panel Appearance

If LCD light is ON, LED light will be OFF. They do not give light simultaneously. During setting up of the DHW or CH temperatures with control panel knobs, LCD panel will automatically starts emitting light and LEDs will be OFF. LED light will start to give light again 5 seconds after setting of the control panel with knobs, according to the relevant parameter input described above.

2.5.1 ON/OFF and Domestic Hot Water Control Knob

This feature allows the user to ON / OFF the boiler and set the desired temperature for the domestic hot water. When the blue pin on DHW knob indicates the gap under the temperature legend ‘1’, boiler is OFF and not only the central heating mode but also the domestic hot water mode is OFF position.

When the indicator knob position passes over the legend ‘1’, domestic hot water mode is ON. From number 1 to 7 domestic hot water temperature can be adjusted. Turning clockwise increases the set temperature.

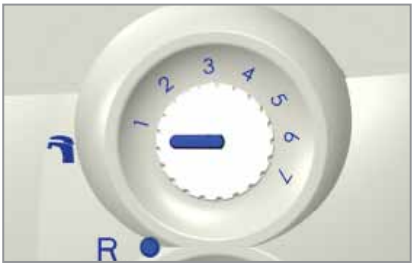


Figure 5 DHW Knob

2.5.2. Central Heating Control Knob

This feature allows user to set the desired temperature for the central heating system water. When central heating knob indicates the region under the legend ‘1’, central heating mode is ‘OFF’. When it passes over the position of legend ‘1’, central heating turns to mode ‘ON’. (Note that domestic hot water knob should not be in ‘OFF’ position to ‘ON’ the central heating mode.) From number 1 to 7 central heating water temperature can be adjusted. Turning clockwise increases the set temperature.

When the indicator knob position passes over the legend ‘1’, domestic hot water mode is ON. From number 1 to 7 domestic hot water temperature can be adjusted. Turning clockwise increases the set temperature.

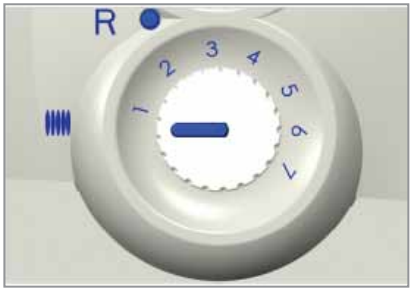


Figure 6 CH Knob

2.5.3. Pressure Gauge (Manometer)

The pressure gauge on the control fascia panel indicates the central heating system pressure. The normal running pressure is around 1 bar (cold) indicated by the solid green line.

Figure 7 Manometer

1) Lower red region: Indicates that water pressure is not sufficient. Boiler doesn’t work in that region. It should be pressurized (filled) via water supply into the system.
2) Lower green region: When the boiler isn’t working, water pressure should be in that region.
3) Upper green region: Indicates the maximum pressure level while the boiler is working.
4) Upper red region: Indicates that water pressure is over the required level. Water should be removed from the system until the manometer shows the lower green region. If the manometer shows the upper solid red line, 3-bar safety valve removes the water from the system automatically.

2.5.4. LCD Display

LCD Display shows boiler operating mode, temperature and indicates the faults instantly as they arise. Digital numbers can be monitored on the blue background screen during setting the CH and DHW heating temperatures or parameters of the boiler.

When the boiler is OFF, power of the screen is cut off.

When there is CH demand, " " sign appears on the screen and temperature of central heating water on heat exchanger exit can be read as Celsius degrees.

When there is DHW demand, " " sign appears on the screen and temperature of sanitary water on heat exchanger exit can be read as Celsius degrees.

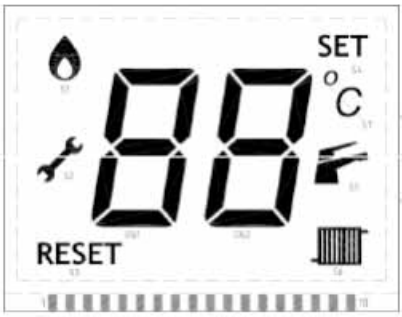


Figure 8 LCD Display Screen

During the operation of the boiler " " sign displays continuously. The monkey wrench sign " " appears in some cases of operating errors, indicating that there is a need for the service.

2.5.5. Reset Button

Boiler locks itself in the below conditions and waits for the user interference.

1) Failure of three consecutive firing attempts.

2) Exceed the high temperature limit.

In those conditions the user should control if there is an operating error that requires resetting of the boiler. Following this, the boiler can be started by switching the reset button ( ).

3. BOILER OPERATION

3.1 Start-Up / Pre-Checks

- Check if the electricity, gas valves and water valves are open.
- Open the radiator valves.
- Check if there is mains water supply. If mains water supply is OFF, heating system water might flow to the mains water installation, emptying the radiators.

3.2 Water Filling

WARNING! Do not charge water while the boiler is running. Wait for the boiler to cool down before filling water.

- If the pressure gauge shows below the lower green zone, water must be charged to the boiler and the heating system. To do this;

Turn the water-filling tap at the boiler bottom slowly to open.

WARNING! If you fill the system very rapidly, air may collect in the heating system or in the boiler.

- Water should be charged until the pressure gauge indicates green region pressure. Do not forget to turn the filling tap off after water filling is completed.
- Turn the boiler ON.
- Check the pressure on pressure gauge as the system heats up after a while. Pressure should not exceed green region.
- Open the air release taps on the radiators and at the highest point of installation, if any. Wait until water drains continuously before closing the air release taps.
- Check “insufficient system pressure” code and pressure gauge again. If the code appears, charge water to the system again.

WARNING! If there is noise in the boiler or installation, repeat air-releasing process.

WARNING! It is recommended that the boiler be turned OFF during air releasing process.

- Check the heating system pressure regularly.

3.3 Domestic Hot Water Operation

- Turn the DHW control knob to ON ( ) position. Sign " " will appear and number on the screen will indicate set temperature of sanitary water.
- When there is a call for hot water as a hot water tap is opened; the boiler senses the flow to the taps and, if it is in stand-by, automatically starts the ignition sequence.

  " " sign will appear on the screen.
- The 3WV valve shuts down the heating system and the full boiler power becomes available to meet the hot water demand.
- The domestic hot water sensor controls the heat input to maintain the hot water at the temperature level selected by the user via the domestic hot water control knob.
- A temperature range between 35°C and 60°C can be set.

3.4 Central Heating Operation

- Turn the DHW control knob to ON ( ) position. The LCD screen will turn on with its blue light.
- Turn the central heating control knob ON position ( ). The system pump will now run and the boiler control algorithm will start the automatic ignition sequence. Set the heating temperature control to the desired level. A temperature adjustment is possible between 30°C and 80°C.

  The boiler control algorithm will now maintain the set temperature, modulating the heat input to match the heating load. When the desired water temperature is reached and read by the sensor, the boiler will shut down. The system pump will continue to run to dissipate the heat from the boiler.

In Summer:

When there is no call for heating but only for hot water, e.g., in summer, turn the CH control knob to the OFF position, but leave the DHW control knob in the ON ( ) position.

3.5 Turning the boiler OFF

- Turn both the CH control knob and the DHW control knob to the OFF position.
- Turn the gas and electricity supplies to the boiler OFF.
- If the boiler is switched OFF when there is a likelihood of frost; water in the boiler should be drained off by opening the house central heating drain tap.

3.6 Central Heating System Discharge

Do the following in case of a discharge of the central heating system water;

- Turn on the drain tap at the bottom of the central heating system.
- Open the air release taps of radiators. Begin from top radiator to bottom one.
- Close the air release taps after draining the water.

ATTENTION! It is not recommended to discharge the system except for the necessary events.

- When the boiler is switched off at the switch on the control panel, the word OFF appears on the display. The D.H.W and central heating frost protection system, nevertheless, remain enabled. If the boiler was previously on, it is switched off and the post-ventilation, pump overrun, circulation pump and three-way valve inactivity protection functions are enabled.

3.7. Topping-up the system with water

The water pressure in the central heating circuit must be checked in case of a DHW request error notification. The pressure gauge located in front of the pump, should be within the green region and must not be less than 1 bar.

If there is insufficient water in the boiler, the error code F0 (Table 7) will appear on the display indicating that there is not enough water in the system.

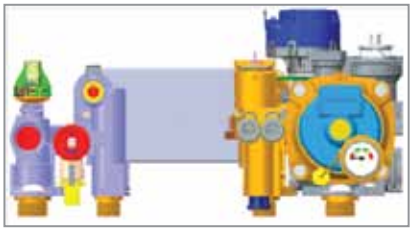


Figure 9 Hydraulic Group- Manual filling tab

To bring the system back up to pressure, open the manual filling tap (Fig.9) and check the system pressure until it reaches to 1 bar.

Close the filling tab, when the operation is complete.

INSTALLATION AND SERVICING

4. INTRODUCTION

Please read these instructions carefully to ensure the correct installation and operation of the appliance.

These instructions cover the room sealed HARMONY-D model in the ALARKO-CARRIER boiler range.

This Installation and Servicing Manual contains information on installation, commissioning, servicing procedures, description of main parts, wiring diagrams and electrical connections, adjustments and fault finding. A detailed fault finding section is included towards the end of the manual.

Before commencing the installation of the boiler check the labels and data plate on the boiler to ensure that the appliance is compatible with the local gas and electricity supply conditions. In the case of any uncertainty, contact with the local gas supplier.

4.1 INSTALLATION RULES

4.1.1 GENERAL

1) Current Gas Safety (Installation and Use) Regulations state that all gas appliances must be installed by a competent person in accordance with the regulations and rules in force in the countries of destination.
2) Failure to install appliances correctly could lead to prosecution.
3) These appliances must be installed in accordance with relevant National and local rules and regulations in force. The manufacturer's notes must not be taken, in any way, as overriding statutory obligations.
4) To ensure that the installation will perform to the highest standards, the system and components should also conform to any relevant National and/or local standards in addition to those mentioned in the instructions.

5) The advice and instructions given in this document covers, as far as possible, the foreseeable situations, which may arise. Contact manufacturer for further advice if required.

6) Installation using the standard flue kit is described in the main text of these instructions. NO OTHER FLUE KITS OR EXTENSIONS MAY BE USED WITH THIS APPLIANCE

7) These appliances are for use with SEALED SYSTEMS ONLY.

4.1.2 BOILER LOCATION

1) This appliance may be installed in any room provided that attention is drawn to the requirements of the relevant national and local rules, standards and regulations in force in the countries of destination. Where it is installed in a room containing a bath or shower, any electrical switch or appliance control using mains electricity must not be able to be touched by a person using the bath or shower.

2) The appliance is not suitable for external installation.

3) The appliance does not require any special wall protection.

4) The wall must be capable of supporting the weight of the appliance. (See Table 1.)

5) Always consider the possible need to disconnect the pipes from the appliance after installation.

6) The following clearances on Table 2 must be available for installation and for servicing.

Table 2 Clearances for boiler installation

Clearances	
Above the casing	200 mm
Below	100 mm
Right hand side	30 mm
Left hand side	30 mm

7) If the boiler is to be installed in a timber framed building it should be fitted in accordance with the relevant National and local rules and regulations in force, if any.

8) No combustible surface must be within 75 mm of the casing. If there is need to adjust near a combustible surface, follow the clearances on Table 2.

9) The appliance can be installed in a cupboard used for airing clothes provided that the requirements of relevant National and local rules and regulations (if any) are maintained.

10) The airing space must be separated from the boiler space by a perforated non-combustible partition. Expanded metal or rigid wire meshes are acceptable provided that the major dimension is less than 13 mm.

11) Not withstanding those rules and regulations, room sealed appliance may be fitted in a compartment with no vents as long as the minimum clearances stated in Air Supply, are maintained.

4.1.3 AIR SUPPLY

The appliance does not require a separate vent for combustion air.

The appliance can be fitted in a cupboard with no vents for cooling but the minimum clearances must be increased to those given below. (Note: the clearances at the front are for a removable panel, e.g. a door).

Table 3 Minimum clearances for cupboard installation.

Above the flue turret	150 mm
In front	250 mm
Below	200 mm
Right-hand side	75 mm
Left-hand side	75 mm

If the appliance is to be fitted in a cupboard or compartment with less clearance than those in the table above (minimum clearances are given in the “Boiler Location” section) then permanent air vents for cooling are required. Both located at high and low levels, all vents connecting directly to outside air or to a room. Both vents must pass to the same room or be on the same wall to the outside air.

The minimum free areas required are given in Table 4:

Table 4 Minimum ventilation areas for cupboards without sufficient clearance.

Position of air vents	Air from another room	Air direct from outside
High level	260 cm²	130 cm²
Low level	260 cm²	130 cm²

4.1.4 OPENING THE PACKAGE & TRANSPORT

Refer to the following diagrams. See Fig. 10.

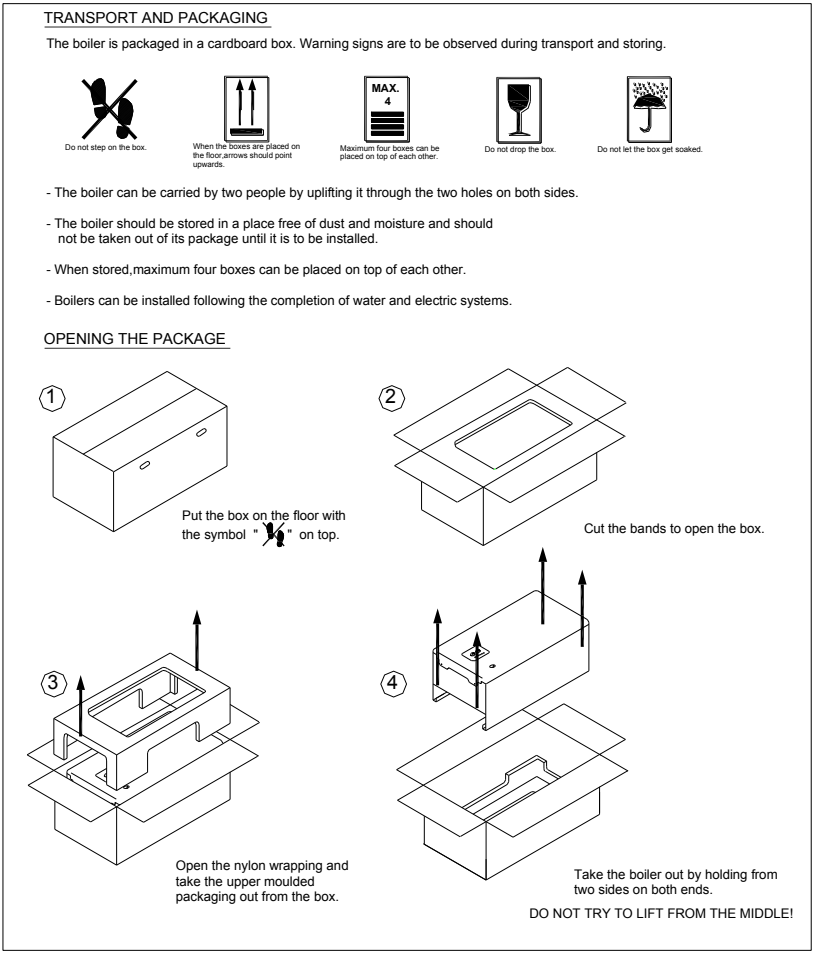
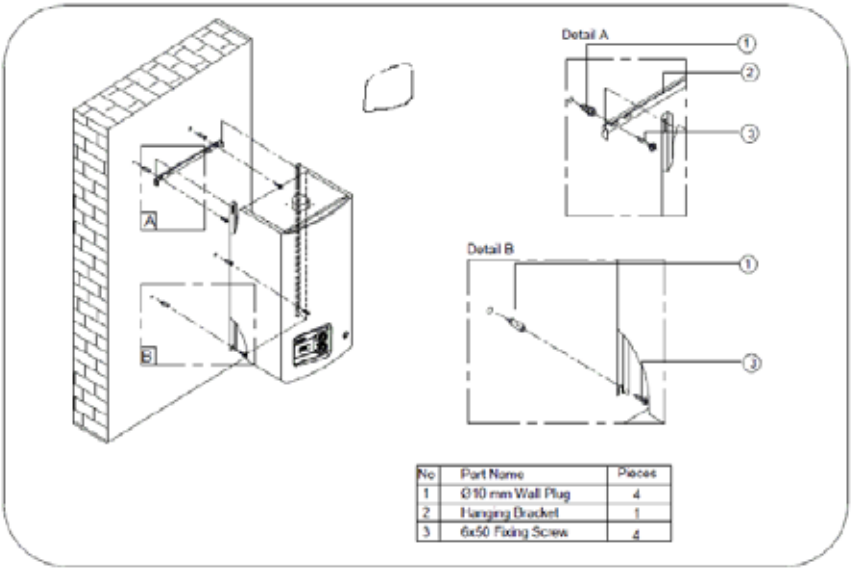

TRANSPORT AND PACKAGING
The boiler is packaged in a cardboard box. Warning signs are to be observed during transport and storing.
Do not step on the box.
When the boxes are placed on the floor,arrows should point upwards.
MAX. 4
Maximum four boxes can be placed on top of each other.
Do not drop the box.
Do not let the box get soaked.
- The boiler can be carried by two people by uplifting it through the two holes on both sides.
- The boiler should be stored in a place free of dust and moisture and should not be taken out of its package until it is to be installed.
- When stored,maximum four boxes can be placed on top of each other.
- Boilers can be installed following the completion of water and electric systems.
OPENING THE PACKAGE
1
Put the box on the floor with the symbol " " on top.
2
Cut the bands to open the box.
3
Open the nylon wrapping and take the upper moulded packaging out from the box.
4
Take the boiler out by holding from two sides on both ends.
DO NOT TRY TO LIFT FROM THE MIDDLE!

Figure 10 Transport & Packaging

4.1.5 MOUNTING THE BOILER

Determine the right position for the wall-hang boiler with respect to the required clearances for servicing, general access and position of the flue. Fix the mounting bracket to the wall, with the fixings provided, ensuring that it is horizontal. Hang the boiler on the mounting bracket and fix the boiler to the wall from the bottom. (See Fig. 11)



No	Part Name	Pieces
1	Ø10 mm Wall Plug	4
2	Hanging Bracket	1
3	6x50 Fixing Screw	4

Figure 11 Mounting Schematic with essential dimensions.

4.1.6 Water and Gas Connections to the Boiler:

CH water connections should be made via ¾'', gas and DHW connections should be made via ½'' isolation valves (see Fig. 12). For copper installations ¾" and ½" dimensions correspond to Ø 22 and Ø 15 mm respectively. Take care that the seals provided are correctly fitted between the installation kit fittings and the connection tails.

Purge the gas supply before finally connecting the appliance. The complete installation must be tested for gas soundness.

Thoroughly flush the heating system and the cold water mains supply in accordance with the recommended methods. After this operation,

ensure that the water filters at the water inlet are cleaned before finally connection the boiler to the water installation.

Check that no dirt is left in either the gas or water pipe work as this could cause damage to the appliance.

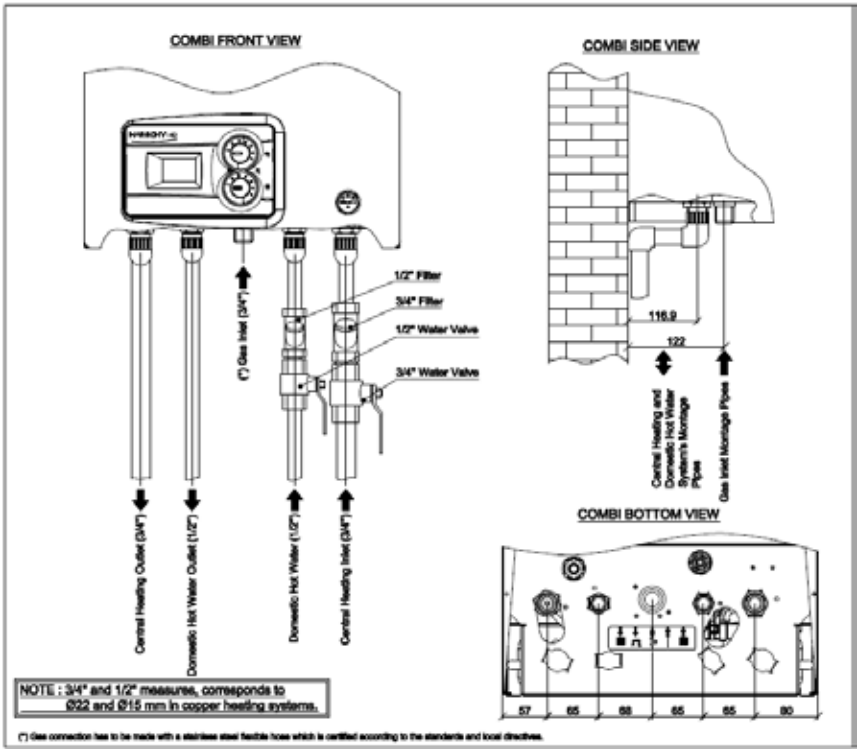

COMBI FRONT VIEW
COMBI SIDE VIEW
1/2" Filter
3/4" Filter
1/2" Water Valve
3/4" Water Valve
(*) Gas Inlet (3/4")
116.9
122
Central Heating and Domestic Hot Water System's Montage Pipes
Gas Inlet Montage Pipes
COMBI BOTTOM VIEW
Central Heating Outlet (3/4")
Domestic Hot Water Outlet (1/2")
Domestic Hot Water (1/2")
Central Heating Inlet (3/4")
57
65
88
65
65
80
NOTE : 3/4" and 1/2" measures, corresponds to Ø22 and Ø15 mm in copper heating systems.
(*) Gas connection has to be made with a stainless steel flexible hose which is certified according to the standards and local directives.

Figure 12 Gas & Water Connections

4.2 FLUE SYSTEM AND INSTALLATION

4.2.1 Sitting the Flue Terminal

The flue must be installed according to national and local regulations (See Fig. 13).

The terminal must not cause an obstruction or the discharge cause a nuisance.

If the terminal is fitted within 1000 mm of a plastic or painted gutter or

within 500 mm of painted eaves, then an aluminum shield at least 1000 mm long should be fitted to the underside of the gutter or painted surface.

The terminal should be fitted less than 2 meters above a surface to which people have access.

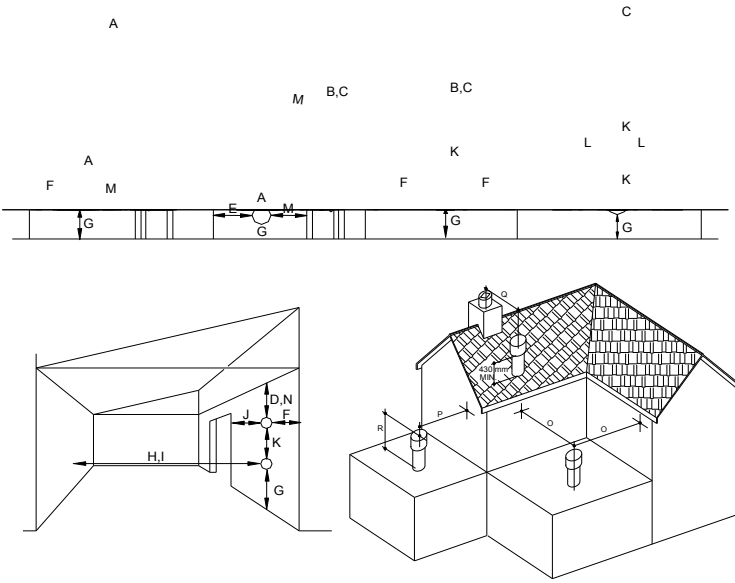
In certain weather conditions a terminal may steam and sitting where this could cause a nuisance should be avoided.

Take care to ensure that combustion products do not enter ventilated roof voids.

Where elongation of the flue pipe is a necessary, only original extension pipe and elbow must be used.

The flue system can be installed from inside the room without access to the external wall and regardless of the wall thickness providing that a suitable wall liner is fitted.

ATTENTION! Flue terminal must be fitted with 3% downward inclination to prevent rain leaking in to the boiler.



A	Distance to an openable window,air vent or any other ventllation opening from below	300
B	Distance to roof gutter or drainage and soil pipes from below	75
C	Distance to eaves from below	200
D	Distance to balconies from below	200
E	Horizontal distance to vertical drainage and soil pipes	150
F	Distance to inner and outer corners of walls	300
G	Distance to adjacent ground or balcony level from above	300
H	Distance from a surface facing the terminal	600
I	Distance from facing terminals	1200
J	Horizontal distance to an opening (door/window)under the lean -to roof	1200
K	Distance to another terminal on the same vertical axis	1500
L	Distance to another terminal on the same horizontal axis	300
M	Distance to an adjacent opening such as a door or window on the same horizontal axis	300
N	Distance to lean -to roof from below	600
O	From adjacent wall	300
P	From adjacent opening window	1000
Q	From another terminal	600
R	Minimum height	300

All dimensions are in mm.

Figure 13 Flue Terminal Dimensions

See figure 14 to identify the parts of the flue kit. Flue kit item numbers in this figure are used in the following installation guides.

4.2.2 Parts of Harmony_D RSF Flue System

PART NO	DESCRITION	PICTURE NO	WHERE USED					
			STANDART KIT	EXTENSION KIT L=500	EXTENSION KIT L=1000	90° TURING KIT	EVELATION KIT	STRAIGHT DUCT KIT L:1500
			58990220105	58990220106	58990220107	58990220108	58990220082	58990160258
1	Flanged Elbow	3-1103248	1					
2	Flue Terminal	3-1103252	1					
2a	Flue Terminal Outer Duct	4-1103250	1/1					
2b	Flue Terminal Inner Duct	4-1102396	1/1					
2c	Plastic Head	3-1102397	1/1					
3	Wall Seal	4-1102398	2					
4	Centralizing Spring	4-1102399	1	1	1			
5	O-ring	4-1102891		1	1		1	
5-a	O-ring	4-1102891	2			2		
6	Elbow Gasket	4-1102401	1					
7	Clamp	4-1102402	1	1	1	2	1	
8	Screw 3,9x19 F-R		2	2	2	4	2	
9	Screw 3,9x19 C-R		4					
10	Elbow Seal	4-1102403	1			2	1	
11	Pipe Seal	4-1102404		1	1			
12	Extension Outer Duct L=467	4-1103251		1				
13	Extension Inner Duct L=507	4-1102406		1				
14	Extension Outer Duct L=1000	4-1103251			1			
15	Extension Inner Duct L=1040	4-1102406			1			
16	Elbow Without Flange	3-1103249				1	1	
17	Elevation Outer Duct	3-1102407					1	
18	Elevation Inner Duct	4-1102886					1	
19	Straight Outer Duct L=1500							1
20	Straight Inner Duct L=1500							1
21	R.S. Flue Kit Package Labe	4-1102893	1					
22	Plastic Bag		1					
23	R.S.Flue Elevation Kit Package	4-1102892	1					
24	R.S. Flue Kit Package	4-1103133	1					

For 90° turns, an extension of necessary lenght sho uld be used before the elbow. This duct should be straight on both ends. For this purpose both inner and outer ducts of the standart extension kit can be used by cutting both ducts (and inner pipe from the o-ring end) at equal lenghts or it can be supplied by cutting the required lenght from the inner and outer ducts of the 1500 mm straight duct kit.
The cutting lenght for the inner duct should be "X+40 m" where Xis the cutting lenght for the outer duct.
These straight ducts are not supplied within the " 90°turning kit " but ordered seperately from the main supplier.

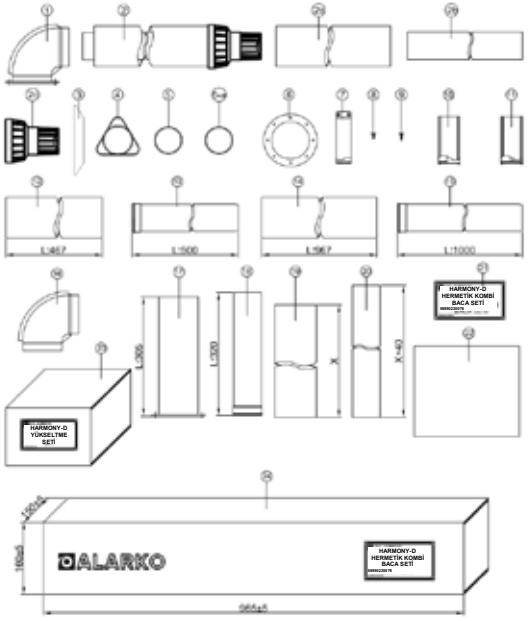


Figure 14 The Parts of the Flue Kit

4.2.3 Standard Supply (concentric horizontal)

The appliance is supplied with a standard concentric air and flue duct system suitable for flue lengths of up to 725mm (28.5 in) measured from the centre of the fan outlet of the boiler to the outside surface of the wall (or window). The duct assembly is connected to the boiler via a turret elbow, which can be positioned to exit the boiler in any horizontal direction (see Fig. 15).

For flue lengths less than 650mm (25.5 in) the outlet terminal duct must be shortened. Shorten the duct by cutting approximately equal lengths from both halves as required.

4.2.4 Additional Kits

The following additional concentric kits are available as optional extras and these flue kits may be used with the standard flue kit to give an extensive range of flue options. Examples are illustrated in Fig. 14.

a) Extension Duct:

With the use of concentric flue extension ducts (see Fig.14), the total flue length of the system measured from the centre of the fan outlet of the boiler to the outside surface of the wall (or window) can be increased up to 3000 mm (118 in) (See Fig. 14). Each 1000 mm extension duct extends the flue length by 973 mm. and each 500 mm extension duct extends the flue length by 473 mm.

b) 90o Elbow:

Additional 90° elbows can be added to the flue system to allow additional bends in the flue system to give greater flexibility in the location of the boiler.

The resistance of the bends must be taken into account when determining the permissible maximum length of the flue system. A 90o elbow has an “equivalent length” of 973 mm, one 1000 mm extension duct. No more than two elbows should be used.

c) Elevation Duct:

This is to be used for elevated horizontal flues if required. With standard elevation duct, 300 mm elevation is possible from the top of the boiler before turning to the horizontal direction with elbow.

NOTE: Variations may be used providing that the following rules are strictly adhered to:

1. The maximum permissible horizontal length of the flue system is: 3000mm. This length has to be considered 973 mm less for the use of each additional 90° elbow.
2. The standard terminal must always be fitted horizontally. The flue system must only terminate in a horizontal position. However 900 elbows may be used to drop the height of the flue system by 500 mm.
3. The flue system must use either a flanged elbow or a flanged elevation duct at the entry / exit to the appliance.
4. All joints must be correctly made and secured in accordance with the installation instructions in “Flue System Installation” section.

Refer to Figs. 15 & 16 to determine which flue options are required before commencing the installation.

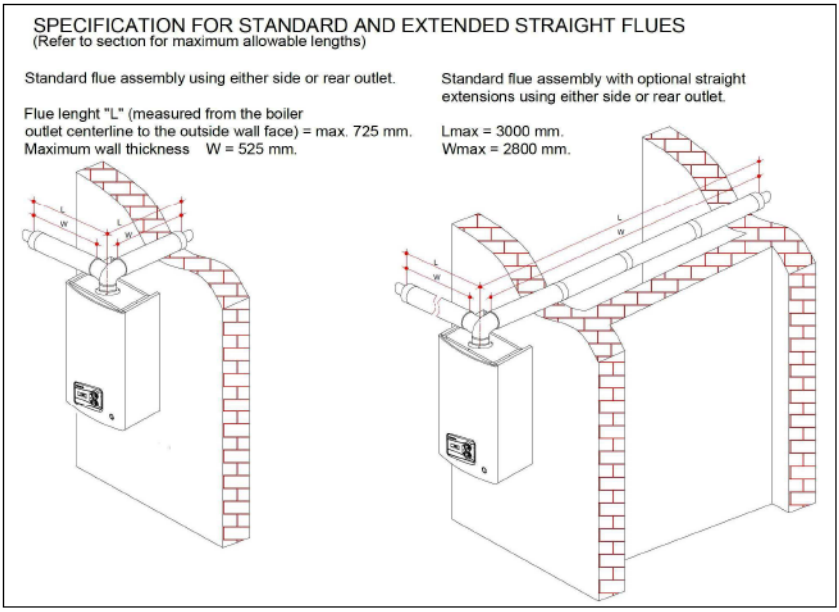

SPECIFICATION FOR STANDARD AND EXTENDED STRAIGHT FLUES
(Refer to section for maximum allowable lengths)
Standard flue assembly using either side or rear outlet.
Flue lenght "L" (measured from the boiler
outlet centerline to the outside wall face) = max. 725 mm.
Maximum wall thickness W = 525 mm.
Standard flue assembly with optional straight
extensions using either side or rear outlet.
Lmax = 3000 mm.
Wmax = 2800 mm.

Figure 15 Wall Connections

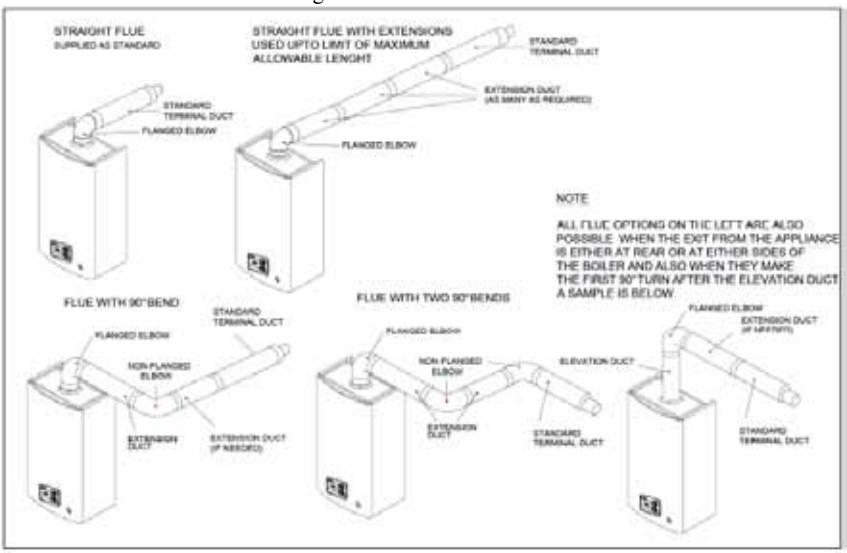


Figure 16 Extensions & Elbow

4.2.5 Installing the Standard Supply

Each boiler is supplied with standard flue system for flue lengths up to 725 mm. See Fig. 17 to assemble and install the standard flue system. Reference will be made to additional kits where necessary.

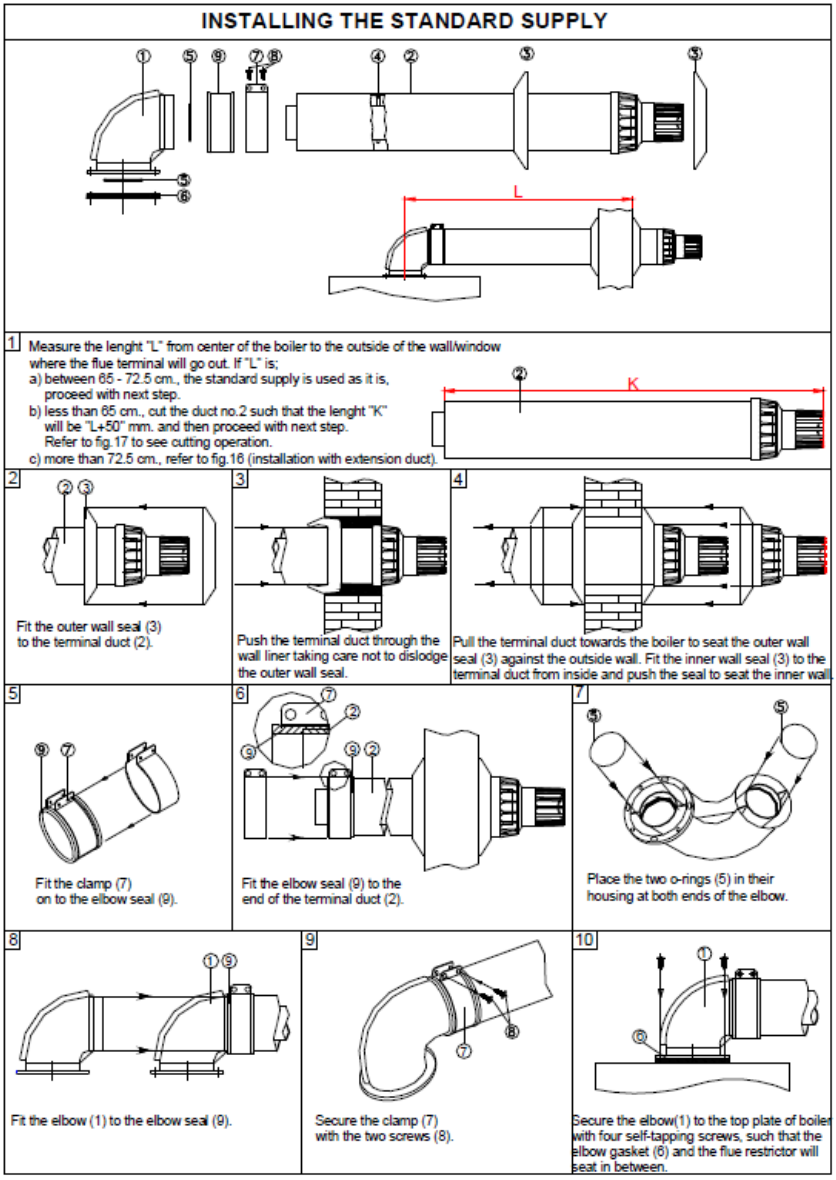

INSTALLING THE STANDARD SUPPLY
L
1
Measure the lenght "L" from center of the boiler to the outside of the wall/window where the flue terminal will go out. If "L" is;
a) between 65 - 72.5 cm., the standard supply is used as it is, proceed with next step.
b) less than 65 cm., cut the duct no.2 such that the lenght "K" will be "L+50" mm. and then proceed with next step. Refer to fig.17 to see cutting operation.
c) more than 72.5 cm., refer to fig.16 (installation with extension duct).
K
2
Fit the outer wall seal (3) to the terminal duct (2).
3
Push the terminal duct through the wall liner taking care not to dislodge the outer wall seal.
4
Pull the terminal duct towards the boiler to seat the outer wall seal (3) against the outside wall. Fit the inner wall seal (3) to the terminal duct from inside and push the seal to seat the inner wall.
5
Fit the clamp (7) on to the elbow seal (9).
6
Fit the elbow seal (9) to the end of the terminal duct (2).
7
Place the two o-rings (5) in their housing at both ends of the elbow.
8
Fit the elbow (1) to the elbow seal (9).
9
Secure the clamp (7) with the two screws (8).
10
Secure the elbow(1) to the top plate of boiler with four self-tapping screws, such that the elbow gasket (6) and the flue restrictor will seat in between.

Figure 17 Standard Flue Kit Installation

ATTENTION! Step 3 of Fig.17 shows how to fit the terminal duct from inside the room where access to the outside wall is not possible. Such a sliding operating can be done providing that the optional wall liner is used. (This is required to seal any cavity and to allow the sealing ring to pass through from inside and provide an adequate external seal). The wall liner is a tube of 130 mm diameter with a wall thickness of 0.8 mm. This step may be skipped where outside wall is accessible and the terminal duct can be pushed through the wall from outside. In this case, an adequate smaller hole can be drilled on the wall to be able to pass the Ø100 mm terminal duct.

4.2.6 Installing the Flue System with Straight Extension Kit:

In case the total length required for a straight outlet from the wall is more than 725 mm, 500 and/or 1000mm extension kits should be used with the standard kit. Refer to Fig. 18.

INSTALLATION WITH EXTENSION KIT

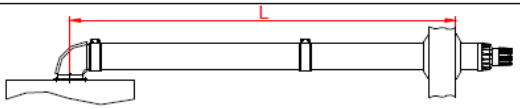
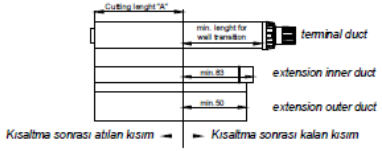


Table -1

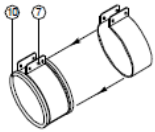
L	Number of Extension Kits		Cutting Lenght (A)
	L=800	L=1000	
725-1198	1		1198-L
1199-1698		1	1698-L
1698-2171	1	1	2171-L
2171-2671		2	2671-L
2671-3144	1	2	3144-L
3144-3644		3	3644-L

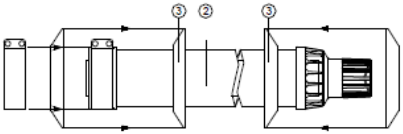
1 Measure the lenght "L" and refer to "Table-1" to determine the type and number of extension kits.

2 To achieve the exact lenght, the flue system must be shortened by the cutting lenght according to Table-1. Cutting operation can be applied to either terminal or extension duct or to both to achieve the total cutting lenght. The minimum lenght for each duct remainin after cutting operation can be as shown in the near figure. Refer to Fig.17 for cutting operation.



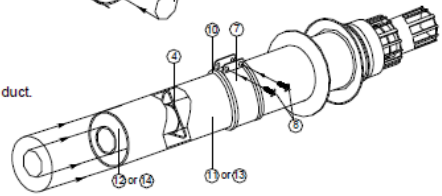
3 Fit the clamp (7) on to the pipe seal (10) and the pipe seal and the wall seals (3) to the terminal duct (2).





4 Place the o-ring (5) in its housing at one end of the inner extension duct.

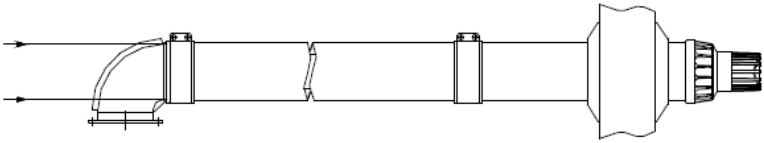
5 Fit first the inner duct of the extension (12 or 14) to the inner terminal duct from the o-ring end then the outer duct of the extension (11 or 13) to the pipe seal (9) at the end of the outer terminal duct. Secure the clamp (7) with the two screws (8). Ensure that the centralizing string (4) stays near the middle of the extension duct.



6 Add any other extension kit to be used to one another as in steps 3, 4 and 5 above.

7 Fit the elbow to the last extension kit, going through the steps 5 to 9 of Fig.15.

8 Push the extended flue system through the wall and place it as described in steps 3 and 4 of Fig.15.



9 Remove the flue restrictor fitted on top plate of the boiler and secure the flue system from the elbow (1) to here with 4 self-tapping screws, such that the elbow gasket (6) will seat in between.

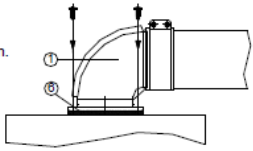


Figure 18 Extension Flue Kit Installation

Before installing the flue systems, either standard supply or with additional extensions and turns, cutting operation might be necessary to shorten the flue ducts. Determine the cutting length as described in other figures and referring to Fig.19 below to see the cutting operation. Use aluminum saw and always ensure that the cut is square and free from burrs or debris.

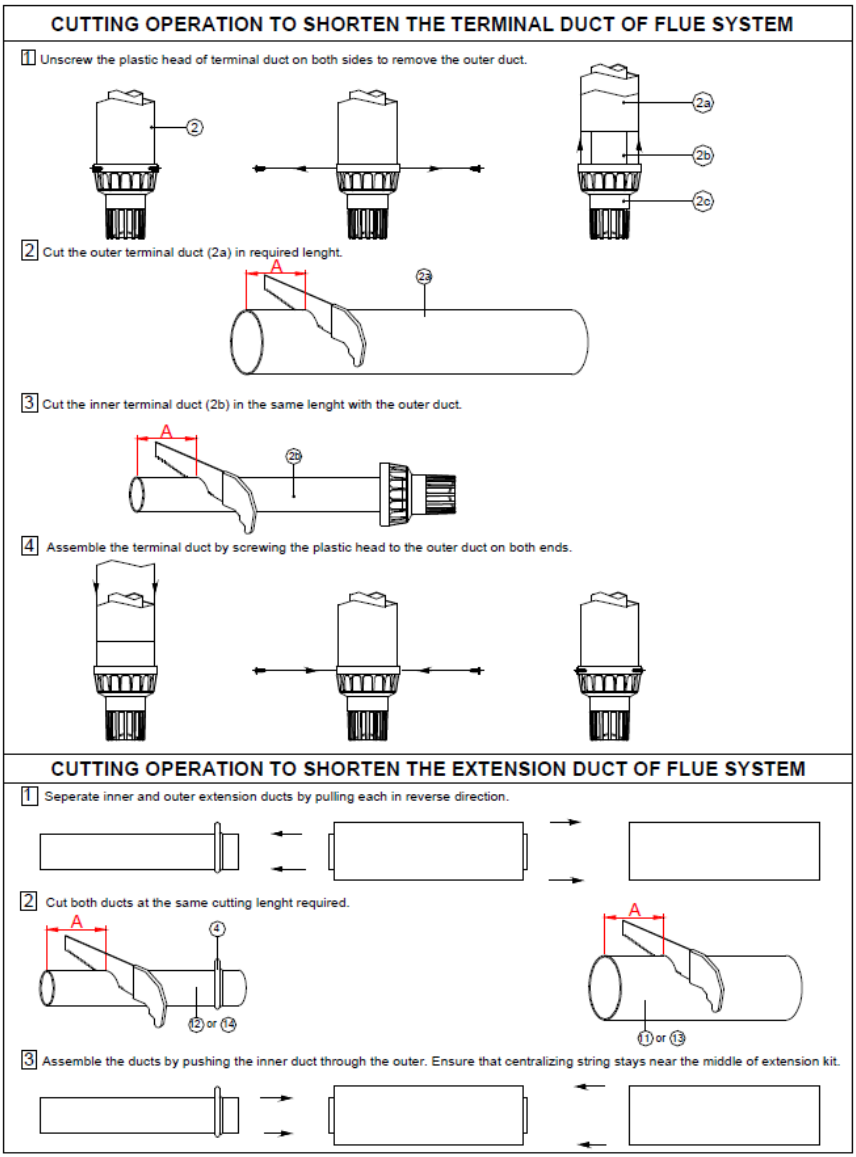

CUTTING OPERATION TO SHORTEN THE TERMINAL DUCT OF FLUE SYSTEM
1 Unscrew the plastic head of terminal duct on both sides to remove the outer duct.
2
2a
2b
2c
2 Cut the outer terminal duct (2a) in required lenght.
A
2a
3 Cut the inner terminal duct (2b) in the same lenght with the outer duct.
A
2b
4 Assemble the terminal duct by screwing the plastic head to the outer duct on both ends.
CUTTING OPERATION TO SHORTEN THE EXTENSION DUCT OF FLUE SYSTEM
1 Seperate inner and outer extension ducts by pulling each in reverse direction.
2 Cut both ducts at the same cutting lenght required.
A
4
12 or 14
A
11 or 13
3 Assemble the ducts by pushing the inner duct through the outer. Ensure that centralizing string stays near the middle of extension kit.

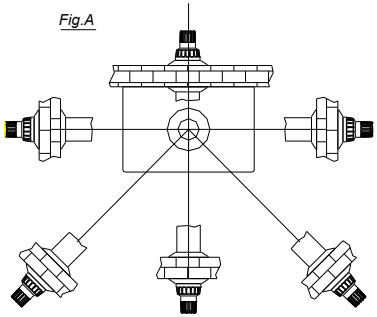
Figure 19 Shortening the Ducts

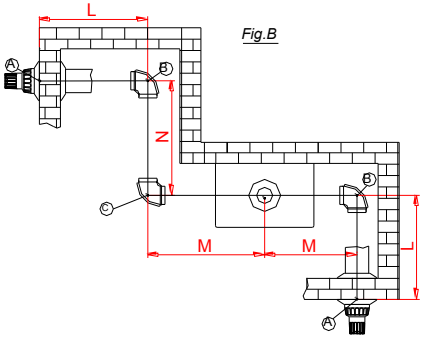
4.2.7 Installing Flue System with 90° Turning Kit

It is possible to install the flue system with 1 or 2 pieces of 90° turns between the boiler and the wall, provided that the total lengths allowed are not exceeded. Refer to Fig.20 for installation.

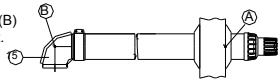
INSTALLATION WITH 90 ° TURNING KIT(S)

The flue system can be installed without any 90° turning kit for positions shown in Fig.A below.
1 or 2 90° turning kit has to be used in positions like in Fig.B where the line from centerline of boiler outlet to the outlet wall surface is not perpendicular.
Maximum total lenght "M+L" can be 2200 mm. for installations with one turning kit and
Maximum total lenght "M+N+L" can be 1200 mm. for installations with two turning kits.

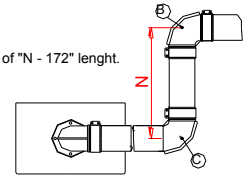


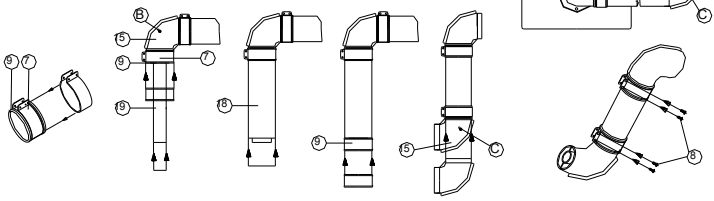


1 Measure lenght "L" from the wall outlet point (A) back to the 90° turning point (B) at the place of installation and install the terminal duct according to this lenght. Installation is done as described in Fig.14 or Fig.15 according to lenght "L". Use elbow (15) instead of elbow with flange (1).

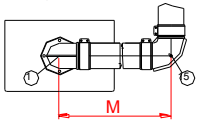


2 (For installation with two turns)
For a required "N" distance;
Prepare straight inner duct (19)of "N - 132" lenght and straight outer duct(18) of "N - 172" lenght.
Refer to Fig.17 for cutting operation.
Fit both inner and outer cut straight ducts to elbows (15) at both ends with elbow seals (9) and clamps (7) and secure the clamps with screws(8).





3 To complete the installation from turning point to the boiler for a required lenght "M", prepare straight inner duct of "M - 132" lenght and straight outer duct of "M - 172" lenght.
Complete the installation as described in step2 between the elbow (15) and the elbow with flange (1).
(To achieve this distance, an extension kit of necessary lenght can be used between the elbow with flange and the straight ducts.)



4 Secure the flue system from the elbow (1) to here with 4 self-tapping screws, such that the elbow gasket (6) will seat in between.

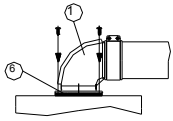


Figure 20. 90° Turning Kit Installation

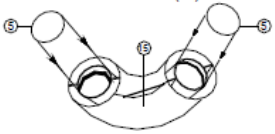
4.2.8 Installing Flue System with Elevation Kit

It is also possible to elevate the flue system on top of the boiler before it makes the first turn to its horizontal path. Flue elevation kit has to be used for this purpose and it can be applied to any of the standard, extended and 90° turning flue systems described in the three sections above. Refer to Fig.21 to carry out the operation. The figure shows how to provide the elevation and this operation will only replace the final assembly between the elbow with flange and the boiler in other installations described in Figs.17, 18 and 20.

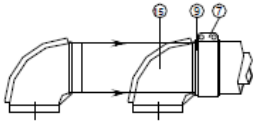
INSTALLATION WITH ELEVATION KIT

1 Can be applied to any of the standard, extended and 90°turning flue installations, between the boiler and the duct before the elbow with flange.

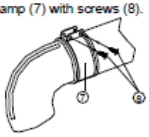
2 Place the two o-rings (5) in their housing at both ends of the elbow (15).



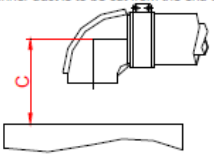
3 Fit the elbow (15) to the elbow seal (9).



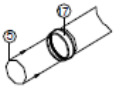
4 Secure the clamp (7) with screws (8).



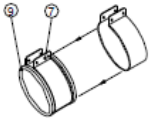
5 Prepare the inner and outer elevation ducts by cutting (see Fig.17) according to the required lenght "C" (no shortening may be neoessary). The standard elevation kit can provide a maximum of 313 mm. elevation. That means, the ducts should be shortened by "313-C" mm. (Inner duct is to be cut from the end without the o-ring.)



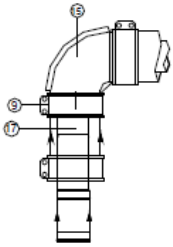
6 Place the o-ring (5) in its housing at one end of the inner duct(17).



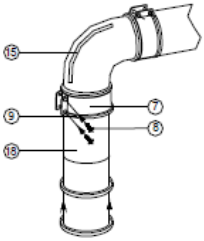
7 Fit the clamp (7) on to the elbow seal (9).



8 Fit the elbow seal (9) and inner elevation duct (17) to elbow (15).



9 Fit the outer elevation duct (16) to the elbow seal (9) fitted on to the elbow and secure the clamp (7) with screws (8).



10 Fit the inner elevation duct (17) to the boiler fan outlet and the outer elevation duct (16) on top of the boiler with 4 self-tapping screws, such that the elbow gasket (6) is positioned in between.

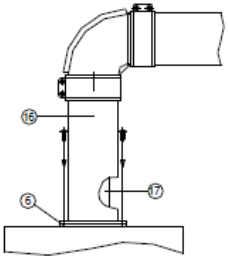


Figure 21. Elevation Kit Installation

IMPORTANT NOTES ON FLUE SYSTEMS

a) Flue terminal must be fitted with 3% downward inclination towards outside to prevent penetration of rain.

b) Failing to comply with these instructions will invalidate the appliance certification and therefore may contravene the appropriate EC legislation and local statutory requirements.

c) After the flue system is completely installed, check that the terminal is correctly located on the outside wall (visibly check from outside the building where possible) and check if the wall seals provide good sealing.

4.3 COMPONENTS & SYSTEM

Note: The Harmony_D boilers must only be installed with a sealed system.

1) The appliance must not be operated without the system being full of water, properly vented and pressurized.
2) The pressure relief valve operates at 3 bar (43.5 lb/in²). The discharge must be directed away from electrical components or where it might be a hazard to the user.
3) The pressure gauge indicates the system pressure, which must be maintained.
4) The 6.0 liter expansion vessel is charged to 1.2 bar.
5) With an initial system pressure of 1.0 bar, a system capacity of about 120 liters can be accommodated. The charge pressure can be increased but this will cause a decrease in system volume.
6) If the system water content is excessive, then an additional expansion vessel should be connected into the system as close as possible to the central heating return connection of the boiler, (see Fig. 23).
7) Water loss must be replaced.

4.3.1 Filling the system

By using the water-filling tap under the boiler, one can simply fill the system with water until system pressure reaches 1-1.2 bar and then close it.

If heating system has its own filling tap and if it is desired to use, the water must be filled by a competent and authorized person. In this case there must be no permanent connection to the mains water supply, even if a non-return valve is fitted (see Fig. 23).

ATTENTION! Domestic hot water system parts should obey all local regulations. If there is a need to fill water at low pressure, a provision should be made.

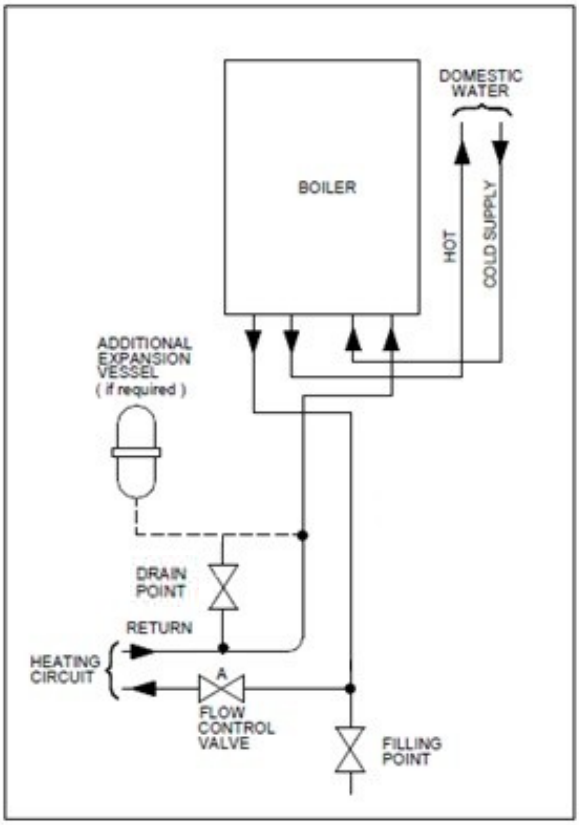


Figure 23 Additional Expansion Vessel

IMPORTANT

All water pipe connections throughout the sealed system must be capable of holding a pressure of up to 3 bars.

Radiator valves must conform to the appropriate standard.

Relief valve discharge must be directed away from any electrical components or from positions where it would cause a hazard to the user.

A suitable drain cock must be fitted to the lowest point of the system.

For circuit design purposes, one should consider the information given in Fig. 24 relating to the available pump head.

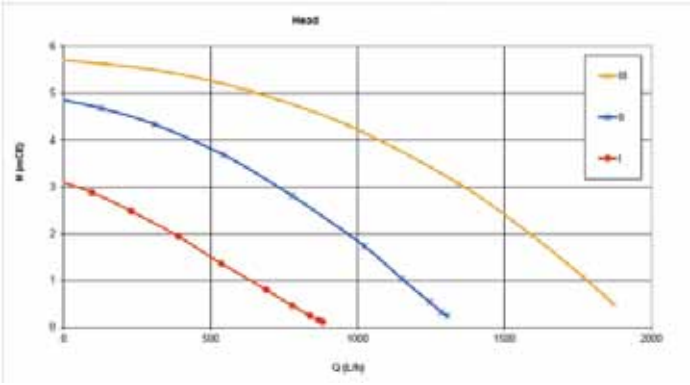


Figure 23 Volumetric Flow Rate & Pressure Difference Relation for the Circulation Pump

**: Graph excludes the internal resistance of boiler.*

4.3.2 DOMESTIC HOT WATER

ATTENTION! Work must not be carried out on the appliance without the gas and electricity supplies being switched off.

- The following are general requirements, but reference should be made to any local Water Supply Company regulations before fitting the appliance.
- Mains Cold Water Inlet. Devices capable of preventing the flow of

expansion water must not be fitted unless separate provisions have been made.

- It should be taken into consideration that, in some countries, the final 600 mm. of the mains cold-water connection to the appliance should be made in copper tube only.
- The appliance is suitable for mains pressure of up to 10 bar (150 lb / in²).
- The appliance must be fitted with a mains supply-isolating valve.
- In hydraulic group there is a regulator that controls the hot water flow. In places where main supply water pressure is low; if it is desired to have much water flow, it can be taken apart.
- Higher flow rates will not damage the appliance but may result in unacceptably low water temperatures.
- In winter (when the mains inlet water temperature is lower) a reduced flow rate at the taps may be required to achieve the type of hot water delivery temperature available in warmer weather.
- It is suggested that long pipe runs to the taps or shower should be insulated to prevent the rapid cooling of domestic hot water after a tap or shower has been turned off.
- Hot and cold taps and mixing valves used with this appliance must be suitable for operating at mains pressure and temperatures of 60°C.
- No back siphonage arrangements are necessary except for some loose head showers. The head of a loose head shower must not fall closer than 25 mm (1in) above the top edge of the bath to prevent its immersion in bath water. Alternatively the shower must be fitted with an anti-siphonage device at the point of the flexible hose connections.
- Thermostatically controlled or pressure equalizing shower valves will guard against the flow of water at too high a temperature.
- The supply of hot and cold mains water direct to a bidet is permitted, provided that the bidet is of the over-rim flushing type, (subject to Local Water Supply Company requirements). The outlet(s) should be shrouded and unable to have any temporary hand held spray attached. No anti-siphonage arrangements are necessary.

- As the maximum temperature of the secondary (water-to-water) heat exchanger is limited by the control circuit, there is normally no need for water treatment to prevent scale accumulation. In exceptional circumstances a device to prevent scale formation can be fitted.

4.3.2.1 Showers, Bidets, Taps and Mixing Valves

- Hot and cold taps and mixing valves used in the system must be suitable for operating at mains pressure.
- Thermostatically controlled shower valves will guard against the flow of water at too high a temperature.
- If using a pressure equalizing valve, set the domestic hot water temperature control knob to the maximum (hottest) position.
- Hot and cold mains fed water can be supplied direct to an over-rim flushing bidet subject to Local Water Company requirements.
- In all mains pressure systems, the flow of water from individual taps will vary with the number of outlets operated simultaneously and with the cold water mains supply pressure to the property. Flow balancing of water draw-off circuits (e.g. via using 'Ball-o-Fix' type valves) is recommended to avoid excessive reduction in flow to individual outlets. For further information and advice contact the boiler supplier.

4.3.2.2 Water Quality

If the appliance is installed in a hard water area, say over 150 ppm temporary hardness, the use of an in-line scale inhibitor may be beneficial. Consult the water supplier in the case of doubtfulness.

4.3.2.3 Water Pressure

Whilst the boiler will operate at a low water inlet pressure, to obtain the full boiler output 0.2 bar dynamic inlet pressures will be required.

4.4 ELECTRICAL

Cable adjusting and cable type between boiler and main supply, should obey all related local and national regulations.

Properties of the Harmony_D PCB are as follows;

Supply voltage	230Vac +10%/-15%
Supply voltage frequency	50Hz +/-5%
Max power uptake	8VA
Maximum permitted humidity	max 90% @ 40°C no condensing
Class of protection against electric shocks	cl.II
Working environment	clean
Protection class	IP00
Printed circuit material	FR4
Protective fuse (line)	1 x 3,15AF (5x20mm)

The data mentioned above – if no different data is indicated – is referred to following standard conditions:

- Temperature: 25°C
- Power supply: 230 V ac

1) It must be possible to completely isolate the appliance electrically.
2) The following connection alternatives must be used: A 3 amp fused three-pin plug and unswitched shuttered socket outlet or a double pole isolator with a contact separation of 3 mm in all poles and supplying the appliance and controls only.
3) The appliance must be earthed.
4) Use the original mains cable provided with the boiler. If there is damage, it should be replaced with an original spare by authorized Alarko Carrier services.

5) The use of a frost thermostat on the boiler is not recommended since the boiler provides internal automatic protection, as long as the mains electricity and gas to the boiler are on. However, if frost protection is necessary for the system, please contact the boiler supplier.

6) Safety Check. After installation or in the event of an electrical fault, the electrical system should be checked for short circuits, fuse failure, incorrect polarity of connections, earth continuity and resistance to earth.

7) Electronic board wiring diagram is showed on Fig 25.

**Refer to detail-X in Fig. 25. if there is no need for room thermostat .*

4.4.1 ELECTRONIC BOARD WIRING DIAGRAM

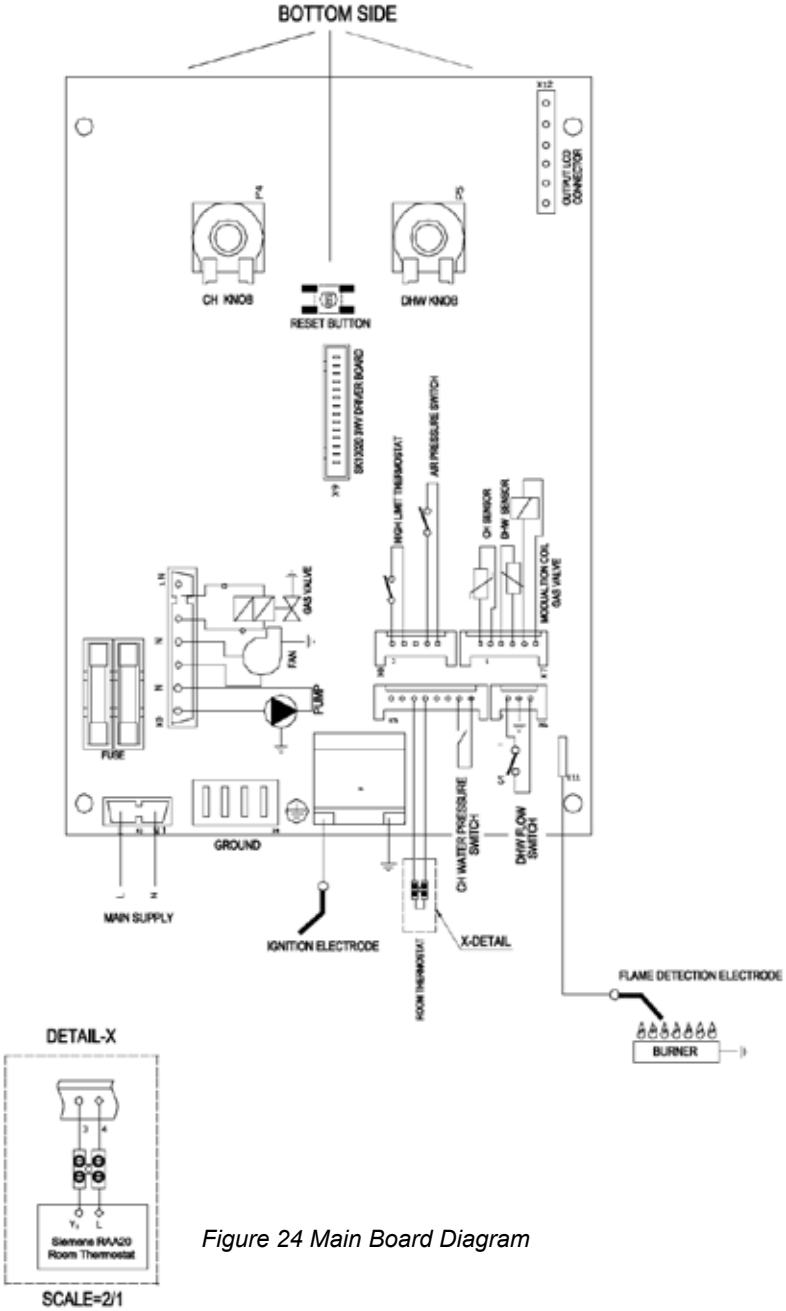


Figure 24 Main Board Diagram

4.5 CONVERSION TO DIFFERENT GASES

The boilers are supplied to work with one of the following gas supply systems:

2H and 2E categories using reference gas G20 (Methane) at a supply pressure of 20 mbar.

3 P category using reference gas G31 (Propane) at a supply pressure of 37 mbar.

3+ category using either G31 (Propane) at a supply pressure of 37 mbar or G30 (Butane) at a supply pressure of 29 mbar.

3 B/P category using either G31 (Propane) or G30 (Butane) at a supply pressure of 29 mbar.

(The adjustment of the appliance is identical for systems 3P, 3+ and 3 B/P with the appliance governor out of action and the inlet pressure is controlled by the supply regulator).

In case a mixed gas is intended for use, the boiler must be regarded as G30 for conversion process and use.

To adapt the boiler so as to work with a different gas within the above gas types:

1) Check type of the gas to be used. The conversion is only allowed to the above-explained gases.
2) Remove the burner (see ‘Servicing section) to replace the injectors on the burner manifold. Use a suitable socket driver to unscrew the injectors from the burner manifold. Select the correct injector size for the new gas (according to ‘Table 1’), obtain new injectors and check if they are free from dust and dirt, and assemble the new injectors using new joint rings.
3) Adjust the minimum and maximum outlet pressures of the boiler gas valve to the correct value given in Tab.1 for that type of gas. Adjustment of pressure is explained in “Commissioning” section in detail.
4) Elektronic Board should also be adjusted. For this go to ‘PARAMETERS’ ADJUSTMENT’ part.
5) Check if the gas supply pressure to the boiler is correct for the type of gas to be used.

For G20 20 mbar

For G30 29 mbar

For G31 37 mbar

For a mixed G30 and G31 29 mbar

6) Start and run the boiler to inspect any abnormal situation.

5. OPERATING PARAMETERS

Table 5 Setting the Parameters

Parameter No	Description	Default	Notes
P01	Ignition capacity percentage; can be modulated between 0-63%	16	%
P02	Gas Type	00-NG	00-NG 01-LPG
P03	CH off time;	60	Sec
P04	Maximum CH capacity	100	%
P05	Range CH	00	00-Normal 01-Reduced
P06	DHW switch off temperature	01	00- 65 °C 01- ON (Set point)
P07	LED strip configuration	01	00- LED always ON* 01-LED ON when flame is ON 02- LED always OFF

* When LCD backlight is ON, LED strip is switched OFF independently from LED strip configuration value.

* When LCD backlight is ON, LED strip is switched OFF independently from LED strip configuration value.

Parameter P01; It controls the outlet gas pressure of gas valve during ignition period. Default setting of P01 ignition capacity is 16 %.

Parameter P02; This parameter is used to identify the type of gas that is used. The default value of this parameter is adjusted for natural gas (00).

Parameter P03; It is used to identify the burner switch ON delay in CH mode. During a CH demand, burner is switched OFF when T flow sensor is greater than T set + 5 ºC while pump is running. When T flow sensor is lower than T set -3 ºC, burner is switched ON after the delay fixed by the parameter P03.

Parameter P04; While adjusting P4 parameter, burner power follows trimmer P5 changes.

Parameter P05; If parameter 5 is OFF (00), CH range is normal (30ºC-80ºC), if it is ON (01), CH range is reduced (30ºC- 50ºC), which is suitable for floor heating applications.

Parameter P06; If parameter 6 is ON, burner is switched ON and OFF according to set point. If parameter 6 is OFF, burner is switched ON and OFF according to a fixed set point.

Parameter P07; If P07 is selected to be 00, the LED illumination is always ON. If this parameter is 01 than, the LED lights will be ON when there is flame and if this parameter is 02, LED is always off.

5.1 Programming operating parameters

5.1.1 Parameter menu activation

- In order to enter parameter menu activation, DHW knob must be outside the OFF range.
- Entering parameter menu any running request is respected.
- By pressing the RESET switch for more than 10 sec. P01* appears on the LCD display.
- By rotating DHW knob P1 value can be set.
- To save the selected P1 value, leave DHW knob in the selected position and press RESET switch for 5 sec.

* Since the display has two digits, P letter and corresponding numbers are visualized alternatively.

5.1.2 Parameter selection mode

- By pressing RESET switch for 1 touch it is possible to select parameters.
- By pressing RESET switch for more than 5 sec., the modification menu is entered then the actual value is shown.

5.1.3 Parameter changing mode

- By moving DHW knob, the desired value can be chosen (SET word appears on LCD screen).
- If RESET switch is pressed for a time greater than 5 sec., the modification is memorized and the system returns to PARAMETER SELECTION MODE with the following parameter already selected.

By moving the CH knob, it is possible to exit PARAMETER MODE.

After 2 minutes without performing anything through DHW knob, an automatic exit is forced and boiler will go back to its normal operating condition.

Table 6 Parameter Adjustment

Locally on board	Description	Value 00	Value 01	Value 02	Value 03
P1	Ignition capacity	Adjustable 0 - 63%			
P2	Gas type	MTN	LPG	3rd	4th
P3	CH off time	Adjustable 0 - 255 sec.			
P4	CH max capacity	Adjustable 0 - 100%			
P5	Range CH	Normal	Reduced		
P6	DHW switch off temp	65°C	Set point		
P7	LED strip configuration (#12 leds)	Always ON *	ON when flame is ON *	Always OFF	

** = Since the display has two digits, if parameter is greater than 99, the first digit is displayed in turn with the other two digits:
e.g. if parameter = 136: 01 is displayed in turn with 36
* When LCD backlight is ON, LED strip is switched OFF independently from LED strip configuration value.

5.1.4 PARAMETERS' ADJUSTMENT

Authorized service can change seven of the parameters related to boiler operation via using the reset button and knobs on the control board.

1) Ignition Gas Pressure: It controls the outlet gas pressure of gas valve during ignition period. By using Table 6, adjustment can be done as percentage. Default setting of P01 ignition capacity is 16 %. In case of a bursting type of burning, this parameter can be adjusted to meet sufficient ignition capacity for a proper burning.
2) Gas Type: It makes the adaptation of the electronic board to gas type change.
3) OFF Time: It is the time between boiler stop and restart again following the heat requirement. The boiler will not restart before this time. Factory setting is 60 seconds. It can be altered between 0-255 seconds' period as percentage by using Table 6.
4) Maximum Heat Capacity: It controls the heat capacity by controlling the gas flow passing through the gas valve. Default setting is 100 %. It can be adjusted between 0 – 100 %.
5) Central Heating Range: The boiler can work in two different modes using this parameter. There are two choices 'ON' and 'OFF'. Default setting is 'OFF: 30-85°C'. The mode 'ON: 30-50°C' is recommended for floor heating systems.
6) Domestic Hot Water Switch Off Temperature: It adjusts the switching point of domestic hot water. There are two choices 'ON' and 'OFF'. Factory setting is 'ON: boiler turns off at 71°C and starts at 70°C'. With the other mode 'OFF' the boiler can be adjusted to 'turn off at "set + 8 °C" and start at "set + 7 °C"'.

ATTENTION! These adjustments should be done by authorized Alarko Carrier Services.

5.1.4.1 Parameters Menu Activation

- In order to enter parameter menu activation DHW knob must be outside OFF range.
- Entering parameter menu any running request is respected.

- By pressing reset switch for 10 sec. P01 appears on LCD. Since the display has two digits P letter and corresponding number are visualized alternatively.
- By rotating DHW knob P1 value can be set.
- To save P1 selected value leave DHW knob in the selected position and press RESET switch 5 sec.

5.1.4.2 Parameter Selection

- By pressing RESET switch for 1 touch it is possible to select parameters.
- By pressing RESET switch for more than 5 sec. the modification menu can be accessed, then the actual value will be shown.

5.1.4.3 Parameter Modification

- By moving DHW knob, the desired value can be chosen.
- If RESET switch is pressed for a time greater than 5 sec. the modification is memorized and the system returns to PARAMETER SELECTION MODE with the following parameter already selected.
- By moving CH knob, it is possible to exit PARAMETER MODE.
- After 2 min. without performing anything through DHW knob, an automatic exit is forced and boiler will go back to normal working condition.

5.2 OPERATING ERRORS

When a problem occurs with operation, the boiler exhibits this fault via LCD display. The diagnosed fault encoding is shown in Table 7;

Table 7 Fault Display

No flame after ignition sequence	F4 + Reset + monkey wrench
Spurious flame	F4
High limit thermostat	F1 + Reset +monkey wrench
Air pressure switch fault	F5 + Reset
Flow sensor fault	F3 + monkey wrench
DHW sensor fault	F2 + monkey wrench
H2O pressure switch cut-in	E0 + monkey wrench

These errors mentioned above, are listed according to their priority orders.

In the case boiler goes through non-volatile lockout, user should switch reset button after literally solving the main cause of the problem.

- If 'no-flame fault' arises, be sure that gas valves are open and gas flow exists. During the first start-up the boiler may lockout since the gas line may contain air. This is quite normal. Reset the boiler 2 – 3 times, waiting 20 seconds between the attempts. If the boiler goes to lockout state continuously consult your authorized service. This error occurs after three ignition attempts for natural gas and one ignition attempt for LPG.
- Spurious flame check will be performed before ignition attempts, so that real flame can be differentiated from the fake one.
- If lockout is caused by excessive temperature, wait for the system water to cool down before another try. The flow pump control remains active depending on the type of demand in progress to execute any specified pump overrun functions (45 seconds for CH with room thermostat and 18 seconds for DHW demand). Several unsuccessful trials may mean a service call is required. Consult your authorized service dealer.
- If "H2O pressure switch cut-in" fault arises, this means there is not enough water in the circulation. In order to avoid this problem, the boiler should be filled with water as it is explained in water filling part.
- For any other fault or repeated lockout conditions, consult your authorized service dealer.

5.2.1 Some Typical Problems

Boiler is running noisy!

Turn off the boiler. Release the air in the heating system. Fill water if necessary. Start the boiler. If there is still noise, call the service.

There is continuous water loss!

Check if there is any leakage at the heating system. If not, call the service.

There is no or insufficient hot water flow through the taps!

Filter at the cold-water inlet of the boiler might be blocked, call the service.

Heating system temperature is rapidly increasing and the boiler is stopping!

There might be air in the system. Vent the system and re-start. If the problem repeats, call the service.

5.3 PERIODIC MAINTENANCE

Harmony- D boilers require very little in the way of routine maintenance.

Check the system pressure gauge from time to time and report any continued fall in pressure to the authorized service personnel. Keep the external casing of the boiler clean by wiping with a soft damp cloth - do not use abrasive cleaners.

If it is suspected that there may be a fault with either the system or the boiler, then do not use the appliance until the suspected fault has been investigated and rectified by a competent person.

To ensure the continued efficient and safe operation of the appliance, it is recommended that it is checked and serviced at regular intervals by the authorized service. The frequency of servicing will depend upon the particular installation and usage, but in general once a year is sufficient. All service work must be carried out only by authorized service personnel. The manufacturer will not take any responsibility for any hazard caused by unauthorized people.

Controls to be done during routine maintenance are listed below:

- Listening to the user’s claims.
- Cleaning of main heat exchanger. Fan motor control
- Functionality control of air pressure switch and hose connection control (room sealed models)
- Control and cleaning of burner injectors.
- Control of insulation panels of combustion room.
- Control and adjustment of electrodes.
- Electric and electronic circuit control.
- Pump control and 3-way valve functionality control.
- Gas side pressure control of expansion vessel.

- Gas soundness control (between gas inlet valve and boiler).
- Water soundness control.
- Cleaning of heating and hot water filters.
- Safety valve control.
- Heating system pressure control.
- Capacity and combustion settings control.
- Combustion products analysis.

Automatic Control Devices

- You can use “room thermostat” with your boiler to maintain desired room temperature.
- With “daily time programmer”, you can set your boiler to run at desired time intervals and temperatures during the day.
- With “weekly time programmer”, you can set your boiler to run at desired time intervals and temperatures during the week.
- With “Wireless RF” or cable “remote control”, you can set your boiler to run at desired time intervals and temperatures during the week, you can see all the operating modes, temperatures and error codes of combi boiler on remote control display, if an outside sensor is connected, you can also see outside temperature on remote control display.
- With “outside sensor”, combi boiler can modulate whether dependent.
- With “outside sensor + room thermostat / daily-weekly time programmer/remote control”, combi boiler can modulate whether and also room temperature dependent.
- With “telephone interface card” you can operate combi boiler on and off from a distance by telephone.

If you have your boiler equipped with other appropriate automatic controllers, you can run your boiler with higher comfort and more economically.

All these controllers are optional. For the safety of your boiler, contact the authorized installers or services to buy any of these options. Do not forget to ask for user manual of the device.

6. Use with LPG

Your boiler can be used with LPG. The boiler must be adjusted to work with LPG by the manufacturer of the authorized service. The boiler is suitable to work with LPG bottles for only if they are connected to the boiler via a special “collector kit” manufactured by Alarko Carrier. In cold environments, the use of a special “heater kit” manufactured by Alarko Carrier is recommended for economic and safe use. In case thermostatic hot water buckets are used to heat up the LPG bottles, water temperature should not exceed 22°C.

Do not place the boiler and the LPG bottles in the same cabinet.

Use certified bottles only.

Do not shake or lay the bottles.

Only use a certified 30 mbar regulator at every bottle exits.

If the bottles are to be placed in closed area, provide adequate venting of the area.

If you smell gas, turn the bottles off and follow the instructions in Gas Safety section.

WARNING! The boiler must be adjusted to work with LPG by the Authorized Service.

The boiler will be out of guarantee unless 30 mbar certified regulators and the collector kit made by Alarko Carrier are used with the boiler.

7. COMMISSIONING

WARNING: Several components operate on mains voltage and with the outer case removed, live components can become exposed.

7.1 Pre Checks

1) Check that the boiler is isolated from the electrical supply, at the external isolator.

2) Fully open the domestic water supply stopcock or valve in the supply to the boiler.

3) Open the domestic water isolation valve below and adjacent to the boiler.

4) Open all hot water draw-off taps and close them when water flows. Check for water soundness of the whole domestic water system and boiler.

5) Pressurize the system until the pressure is 1.5 bars.

6) Open the automatic air vent cap located at the top of the pump. Ensure that the automatic air vent is operating correctly.

7) Check the operation of the safety valve by turning the safety valve knob clockwise until venting can be detected.

8) Take care not to splash any of the electrical components.

9) Check the heating system and boiler for water soundness.

10) Lower the pressure to the initial cold fill design pressure of 1.0 – 1.2 bars are attained.

11) Open the front casing and undo the screw on frontal face of the pump to access the pump shaft.

12) Check that the pump is not blocked by rotating the shaft with a screw driver (the shaft can be forced an amount to rotate, to get rid of possible adhesion due to inactivity for long time).

7.2 Start up

- Open the gas isolating cock adjacent to the boiler.
- Turn on the electrical supply to the boiler
- Set the central heating temperature control to maximum.
- The automatic ignition will start. In new installations it may take a short while for any air in the line to be expelled. If ignition does not take place the burner lockout light will be lit.
- Reset the control system and repeat as required until the boiler fires normally.

- Turn the DHW knob to a desired temperature position and open a water tap fully and check that the boiler lights and operates.

7.3 Setting the Heat Input

The heat inputs for CENTRAL HEATING (CH) and DOMESTIC HOT WATER (DHW) are already set on the boiler when supplied from the factory. The default input settings for minimum and maximum rates for both CH and DHW circuits are the nominal input rates of the boiler given in Table1.

The diagrams in Fig. 26 show the correlation between gas pressure and heat input for all possible gases. The pressure to achieve a desired power output can be found via this diagram. Then the pressure, which can be observed from the U-manometer connected to the gas valve, will be adjusted as described below. In order to calculate the heat output of the appliance for a certain pressure level, multiply the corresponding input rate value by the efficiency. To convert the unit kW to kcal/h, multiply the value by 860.

ATTENTION! Maximum heat inputs should not exceed the given limits.

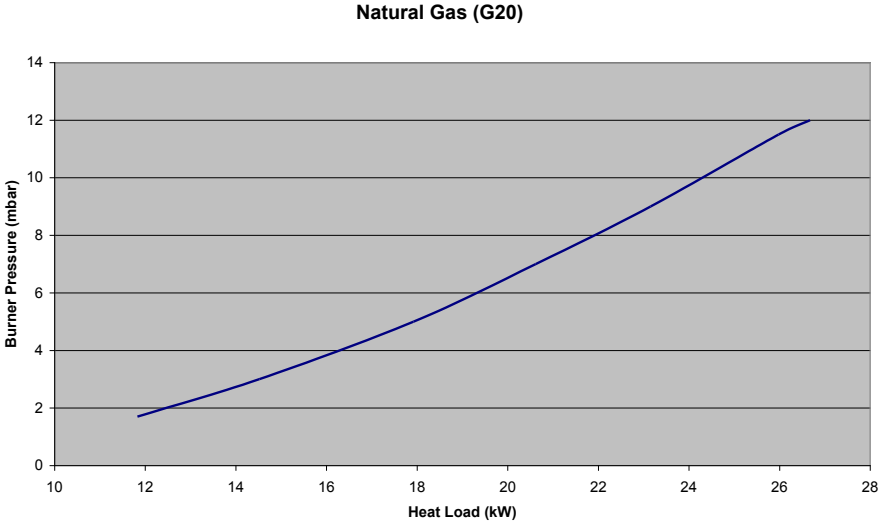


Figure 25 Burner Pressure/ Heat Input Diagram

Before starting the adjustment, dismount the front panel.

ATTENTION! Manometer is fixed to the front panel. Dismount the front panel, as it is stated below: Loosen the two screws, under the panel. Pull the panel slightly and loosen the nut. Take out the manometer from the panel. By pushing the front panel upwards, it can be easily taken apart.

Loosen the screw that fixes the control box, then swing the control box to left and allow the boiler to run for approximately five minutes to stabilize before making the final adjustments to the gas pressure settings. To be able to do the adjustments, the system should call for full heat input. Refer to Figs. 26 and 27 for following steps.

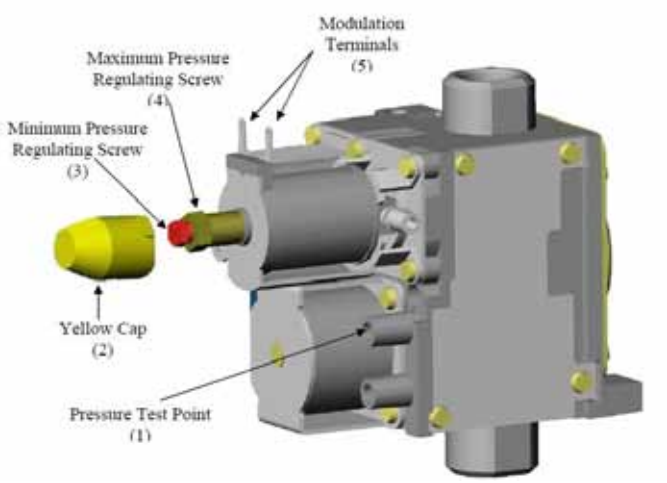


Figure 26 Gas Modulator

7.4 Maximum and Minimum DHW/CH Input Adjustments (mechanical maximum and minimum)

- Loosen the screw of gas valve outlet pressure test point (1) and connect a U-manometer to it.
- Take apart the modulation cables from modulation terminals (5).
- Remove yellow cap (2) to expose pressure regulator adjustment screws (3; 4).

- Turn the red pressure regulator adjustment screw (3) clockwise up to its end position.
- Set the maximum pressure to the desired value by rotating the pressure regulator adjustment screw (4) with a 10 mm spanner. Turning clockwise increases and anti-clockwise reduces the pressure.
- Set the minimum pressure to the desired value by rotating the red minimum pressure adjustment screw (3). Turning clockwise increases and anti-clockwise reduces the pressure.
- Replace yellow pressure regulator cap (2) and the modulation cables.

NOTE: For I3+ category adjusted appliances, where adjustment of the maximum pressure is not allowed and gas supply pressures do not exceed 29 mbar for G30 (butane) and 37 mbar for G31 (propane), set the maximum pressure regulator adjustment screw to its maximum position, then set the minimum pressure regulator adjustment screw as above.

ATTENTION! To disable unauthorized persons' interference, the yellow cap on the gas valve should be painted with a red paint to seal it.

7.5 Final Operational Checks

- After the gas pressure have been set check for correct modulation as follows.
- Set the DHW knob to the max level and fully open a hot water tap. Check that the desired maximum burner pressure is attained.
- Slowly close the hot tap and note that modulation takes place.
- Close the tap and check that the burner goes off.

7.6 Commissioning – Heating System

- Fully open all radiator valves.
- Set the heating system in operation and balance the radiators.

7.7 INSTRUCTIONS TO THE USER

1) Instruct and demonstrate the lighting procedure, then advise the user of the efficient and safe operation of the boiler.
2) Instruct and demonstrate the operation of any heating system controls.
3) Advise the user that to ensure the continued efficient and safe operation of the appliance it is recommended that is checked and serviced at regular intervals. The frequency of servicing will depend upon the particular installation and usage, but in general once a year is sufficient.
4) Draw attention, if applicable, to the Gas Safety (Installation and Use) regulations, which imposes a duty of care on all persons who let out property containing a gas appliance.
5) It is the law that all servicing is carried out by a competent person.
6) Advise the user of the precautions necessary to prevent damage to the system and building in the event of the heating system being out of use during frost and freezing conditions.
7) Leave these instructions with the user.

8. SERVICING

NOTE: Any service work must be carried out by a competent person.

Before commencing any service work TURN OFF the gas and ISOLATE the mains electricity supply to the boiler.

It is recommended that the boiler be serviced at regular intervals. In general, once a year and

preferably before the heating season, is sufficient.

Unless the user has any particular claim about the appliance, steps of recommended preventative maintenance are as follows:

- Start and run the boiler for 5 minutes to see any abnormality and shut it down.

ATTENTION!

Manometer is fixed to the front panel. Dismount the front panel, as it is stated below:

- Loosen the two screws, under the panel. Pull the panel slightly and loosen the nut. Take out the manometer from the panel. By pushing the front panel upwards, it can be easily taken apart.
- Disconnect the electric supply and isolate the boiler from gas and water installations.
- Release the two front casing panel screws located underneath the panel. Lift the front panel slightly to clear the 2 pins at the top and remove.
- Undo the 6 fixing screws of front sealing panel and remove.
- Undo the 4 fixing screws of combustion chamber front panel and burner box skirt and remove.
- Pull off the plug connections to the flame sensing and ignition electrodes.
- Remove the 4 burner fixing screws located at the rear of the burner and the 2 at the front. Pull the burner forward clear of the combustion chamber.
- Check that the combustion chamber insulation panels are not worn out, replace if needed.
- Clean the burner blades with a soft brush.
- Check that the injectors are free from dirt and debris. If necessary clean each injector orifice using a soft brush or vacuum cleaner. Do not use a wire brush or any abrasive material. It is not necessary to remove the injectors unless there is evidence of debris in the orifice.
- Inspect the ignition and flame detection electrodes in situ. If necessary clean with a soft brush. If either the electrodes or the ceramic insulation show signs of damage or wear, replace the electrode(s).
- Replace the burner and electrodes in reverse order, taking care not to damage the lining of the combustion chamber. Check that the position of the electrodes is as shown in Fig. 28. Adjust if necessary by carefully bending the tip of the electrode rod taking extreme care not to put any pressure on the ceramic insulation.

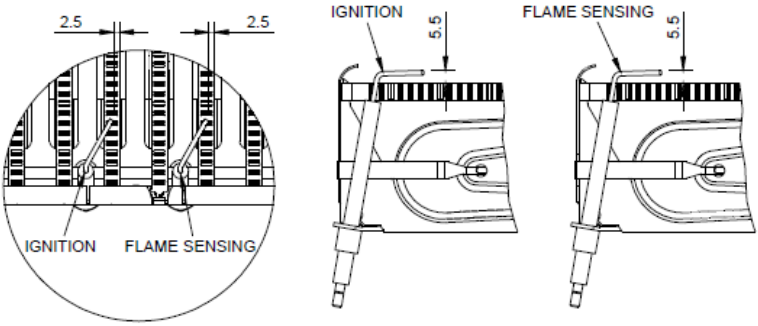


Figure 27 Burner Plates, Igniters and Flame Sensors

- Before taking the hood apart, cover the burner openings for not splitting any dirt from the hood.
- Pull off the electrical connections from the spade terminals on the fan motor.
- Disconnect the flexible air pressure sensing pipes from the fan venturi.
- Remove the fixing screw to release the fan from the flue hood.
- Withdraw the fan downward with a forward twisting action to disengage the fan discharge from the flue connection on the boiler top.
- Inspect the impeller and clean off any dust with a soft brush, or by blowing.
- Remove the air pressure switch by undoing the two screws fixing the switch to the boiler top.
- Undo the fixing screw to remove the right and left air deflector parts of flue hood.
- Remove the flue collector hood by undoing the four fixing screws holding the hood to the rear wall of the boiler inner casing. Withdraw the hood forward clear of the combustion chamber.
- Cover the burner blades to collect any debris and clean the heat exchanger with a soft brush or vacuum cleaner. DO NOT use a wire brush.

- Reassemble the flue hood taking care that the rear lip of the hood is correctly located under the top lip formed on the top of the rear combustion chamber wall.
- Replace the air deflector, fan and air pressure switch in reverse order.
- Check the air pressure switch sensing pipes for damage and replace as required taking care to preserve the correct connection. (The pipe coming from outside air should be plugged to the switch P1 inlet; the pipe coming from fan should be plugged to the switch P2 inlet.)
- Remove the screw on the frontal face of the pump to access the pump shaft and rotate the shaft with a screwdriver to check for any blockage. Clean any dirt and replace the screw.
- Replace the combustion room front panel, in hermetic models hermetic room front panel, and front casing panel in reverse order. Do not forget to screw the two front panel-retaining catches at the top RH and LH sides of the boiler.
- Check the operation of the pressure relief valve as described in “Commissioning” section.
- Check that the system is at the original (cold) design pressure. If necessary, re-pressurize the system.
- Check the airside pressure of the expansion vessel and pump air to increase it up to 1,2 bar.
- On completion of the service work and reassembly of the appliance, check for gas soundness and the correct operation of the appliance as described “Commissioning” section. Reset the controls to the users’ requirements.
- At final, adjust the boiler according to the customer’s desire.

Appendix A

FAULT DETERMINATION

TYPE OF FAULT	POSSIBLE CAUSES	REMEDIES
During start-up the boiler ignites but goes to lock-out without the flame being established *Room Sealed Boilers*	Gas cock not opened Air in the gas line Gas valve not passing the gas Flame occurs but distinguishes and can not reach the ionization electrode	Open the cock and re-start the boiler Reset the boiler for 1-2 times, wait for min. 15 seconds between two attempts Gas valve or electronic board may be defective. Check and remove any loose or wrong connection, replace the defective part if any. For flue systems with no extensions ensure the air restrictor ring is used, remove any air leakage through the hermetic room, increase ignition pressure if insufficient
During start-up the boiler ignites, flame occurs and then goes to lock-out and the red led glows.	Line/neutral connection made wrong (reversely) Ionization electrode not sensing the flame	Alter the line/neutral connection from the mains connection terminal (or by altering the plugging direction, if any) Correct the electrode alignment, check the electrode cable for loose connection
There is electic supply to the boiler but the boiler and the pump are not running	Water pressure switch intervention	Check water pressure, pressure switch and its cable connection.
System is cold, boiler is on, pump is running but combustion does not start (*in room sealed boiler*, fan is not running either)	Wrong or loose electric connection on electr. board or boiler side	Check and remove any wrong and loose connection, replace any defective part not giving access.
In room sealed boilers, System is cold, boiler is on, pump and fan are running but combustion doesn't start	Air pressure switch not giving access	Replace air pressure switch if defective, if air flow is not sufficient find and remove the cause of blockage (for extended flue systems, ensure that air restrictor is removed)
The boiler frequently goes lock-out during normal operation and red light glows	Imperfect alignment or cable connection of ionization electrode Limit thermostat cuts off	Correct the electrode alignment, check the electrode cable for loose connection and grounding Check the operation of limit thermostat and replace if necessary; if not, detect and remove the cause for rapid heating up of the central heating
All connections are correct, the boiler does not modulate	Min. pressure set high Gas valve defect Electronic board defect	Lower minimum pressure setting Replace the gas valve Replace the electronic board
Boiler operates and stops occasionally	Electronic board defect Mains voltage oscillating	Replace the electronic board Ensure the use of a voltage regulator at the mains supply to the boiler

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